

**ROAD SPACE ALLOCATION:
THE INTERSECTION OF TRANSPORT PLANNING,
GOVERNANCE AND INFRASTRUCTURE**

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Abstract

Contemporary professional transport planning and policy continue to focus on resolving the car's place in contemporary urban society. Transport planners really only have two viable alternatives when engaging car-specific concerns: constructing more road space or allocating existing road space to give specific modes priority and/or to reduce travel. The second alternative drives the research programme for this thesis.

For reasons made clear in this thesis, turning to transport-specific bodies of scholarly literature fails to provide a useful starting point to understand road space allocation. This research is therefore situated within a 'mobilities paradigm' (Urry, 2008). The mobilities paradigm provides a heterogeneous view of the world in which to view what is referred in this thesis as the scientific world of transport planning. This opens up useful exploratory lines of inquiry to understand the ways in which the work of transport planners (i.e. animate) allocating road space (i.e. inanimate) is constrained and constituted. This helps reveal limitations of governance, policy frameworks and professional knowledge in allocating road space. Insight from the sociology of scientific knowledge is used to analyse road space allocation from historical and contemporary settings, and to incorporate materiality into analysis.

Utilising a case study methodology, this study critically examines road space allocation in Melbourne, Victoria, Australia. Data is drawn upon from a critical examination of scholarly literature, a document analysis of archival materials and government policy and legislative materials, face-to-face interviews with over 60 practicing and retired transport planners and participant observation of a transport planning exercise.

The findings of this research suggest that though traditional aspects such as politics and legislative mandate do constrain and limit the action and reach of professionals, professionals were found to make and enact normative decisions that resulted in re-imagining road space as more than the site of car travel. Resolving several tensions identified in the thesis which make allocating road space challenging resulted in professionals embodying knowledge and experience reflective of adopting a demand management stance. This stance continues to be advanced by scholars as crucial to destabilising the car's place in contemporary urban society. However, momentum needed to entrench the demand stance at institutional levels is found to be constrained by cyclical and/or alternating mobility visions generated from constant change in state government in Victoria.

Drawing insight from sociology of scientific knowledge has therefore been found to provide for a new and enhanced frame to look at issues related to transport planning, road space allocation and the role of different agents (e.g. actors and infrastructure). Developing new professional knowledge and practices critical to engraining a demand management stance in practice is shown to be informed and enacted through practitioners actively engaging, and/or reacting to and against, technology and infrastructure. This confirms and reinforces the usefulness of tracing the contours of materiality, and in so doing, provides for an improved and more realistic picture of professional transport planning practice. Findings drawn from this thesis therefore advance our current understanding of how professional transport planning practice is constrained and constituted.

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Abbreviations

CRB	Country Roads Board
DOI	Department of Infrastructure
DOT	Department of Transport
DPCD	Department of Planning and Community Development
MCC	Melbourne City Council
MMBW	Melbourne & Metropolitan Boards of Works
MMTB	Melbourne & Metropolitan Tramways Board
MTOC	Melbourne Tramways and Omni-bus Corporation
MTA	Metropolitan Transit Authority
PTC	Public Transport Corporation
PTV	Public Transport Victoria
RCA	Road Construction Authority
RoSTA	Road Safety & Traffic Authority
RPAA	Regional Planning Association of America
RTA	Road Traffic Authority
STA	State Transit Authority
TAC	Traffic Advisory Board
VicRoads	The Roads Corporation (state road authority)

Declaration

I certify that:

- a) except where due acknowledgement has been made, the work is that of the candidate alone;
- b) the work has not been submitted previously, in whole or part, to qualify for any other academic award;
- c) the content of the thesis is the result of work that has been carried out since the official commencement date of the approved research program;
- d) any editorial work, paid or unpaid, carried out by a third party is acknowledged.
- e) ethics procedures and guidelines have been followed.

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Date

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Chapter 1 – Introduction

1.1 *Background to research*

When work began on this research project in early 2010, the Cities of Stonnington and Yarra were on the verge of combining forces to develop a legal case against the state road authority VicRoads, charged with implementing the Victorian government's proposal to extend clearway operating hours. Similar to London's 'Red Routes' a clearway is a road management strategy banning parked cars on a specified road; often during morning and evening peak commute periods.

The public and business community had demonstrated more than a willingness to fight against the proposal to extend clearway hours (Battersby, May 8, 2008; *Herald Sun*, May 8, 2008; Lucas, May 7, 2008; Royall, May 23, 2008). Public protests were followed by newspapers reporting that the Minister of Roads Tim Pallas "had ignored advice" from senior planners regarding the legal requirement of conducting compulsory consultation processes with affected councils (Lucas, October 14, 2008). For almost two years, public technological media "blogs", the municipal newspaper *The Leader* and syndicated newspapers *The Herald Sun* and *The Age* documented a persistent and growing disagreement concerning clearways.

In addition to extending and standardising clearway times, the state also proposed stricter enforcement; promising to tow away all cars parked during clearway times (Victorian Government, 2008). Following a council resolution to construct a legal case against VicRoads (SCC, 15 February 2010), the Mayor of Stonnington along with council officers and businesses placed bags over more than 400 clearway signs the day after advisory notices of impending clearway changes were installed (Brown, February 22, 2010). A few days later, the state towed away 23 vehicles and issued \$117 in fines on another 63 vehicles; all located along roads within Stonnington council (Lucas, February 25, 2010).

The clearway controversy occurred during the run-up to a state election. On December 9, 2010 the newly elected Premier of Victoria Ted Baillieu visited Stonnington to fulfil a campaign promise—rolling back clearways (McMahon, December 10, 2010).

The state's decision to standardise clearways prompts several questions. Are clearways a useful road management tool to engage complex mobility challenges found in today's highly mobile urban societies? There is growing, yet conflicting, evidence that only by packaging together carrot-and-stick policy measures, will motorists switch from their car into other travel modes (Bonnell, 1995; Meyer, 1999; Vuchic, 2000). This would suggest a need to couple clearways with increased public transport services. In this case, extended clearway times remained for only ten months, at which point the Labor government was voted out and, in most councils, clearways returned to their original operating hours. What scale is appropriate to address local activities such as car parking, which often fall within local government responsibility and daily travel across multiple local government jurisdictions, which often fall within the responsibility of state or regional authorities? In Victoria, the state road authority VicRoads is charged with weighing local concerns against metropolitan mobility concerns. And questions remain as to what extent Melbourne's extensive tram network contributed to creating the controversy in the first place. Amidst these and other questions, the clearway controversy provides an example of the types of complex mobility challenges found in today's highly-mobile urbanised cities.

This thesis investigates elements that determine and shape how professional transport planners allocate road space, within the context of broader planning and construction of mobility infrastructure. Situated within the mobilities paradigm, this thesis incorporates concepts and theories contained under the cannon of studies and science and technology to provide a critical investigation of transport planning practice. As elaborated in more detail in this chapter, road space allocation emphasises a difference between use and allocation of road space. In this thesis, road space allocation is understood as emerging from how elements related to transport planning, governance and infrastructure intersect. Melbourne provides a unique case study to examine these elements as well as multiple road space allocation tensions. For example, should road space be allocated based on reducing travel or increasing access to land uses adjacent to road space? What criteria should be applied to determine such decisions based on achieving what goal? This study aims to answer such questions in the context of Melbourne, Australia. This in turn contributes new knowledge to our understanding of how professional transport planning practice is constrained and constituted.

1.2 Questioning the car's role in urban society

The vision of mobility that guided the 20th century—and which remains dominant today—is uninterrupted individual motorised movement with a primary emphasis on the car (Banister, 2011; Curtis & Low, 2012). Attention at professional transport planning and policy levels has therefore remained principally focused on resolving the car's place in contemporary urban society. The car and associated industrial and governmental mechanisms required for the car's survival remain “socially, culturally, economically, politically, ethically and environmentally embroiled in our daily lives, whether we own a car, drive or not” (Merriman, 2007, p. 7). Every car requires a place to park and roads to travel on, which in turn involves government agencies to plan and construct infrastructure, as well as to test drivers, register vehicles and address bad behaviour. This in turn is supported by the private sector, which constructs cars as well as car parts; provides petrol refuelling stations and mechanics for crash repair, and makes drive-in hotels and food chains outlets. In short, the car is intractably interwoven in all aspects of contemporary highly mobile urban societies.

It is therefore helpful to think about contemporary transport planning being driven by a car paradigm. The paradigm concept was arguably made famous in Kuhn's (1970) *The structure of scientific revolutions* (Masterman, 1970; Somers, 1996). “Kuhn's central concern was to characterise the way in which science historically develops” (Keat & Urry, 1975, p. 54). The essence of Kuhn's argument was that science alternates between ‘normal’ and ‘revolutionary’ stages. During normal periods of science, scientists do not question the dominant paradigm. Thus, scientific problems are regarded as “problems which are known to have a solution within the framework of assumptions implicitly or explicitly embodied in the paradigm” (Keat & Urry, 1975, p. 55). In contrast, during periods of revolutionary science, scientists are “confronted by increasingly perplexing *anomalies*, which call into question the paradigm itself” (Keat & Urry, 1975, p. 55, italics in original). The outcome of brief periods of revolutionary science is the emergence of a new paradigm. Kuhn (1970, p. 151) described the “transfer of allegiance” from one paradigm to another as a “conversion experience” that could not be forced.

Conversions will occur a few at a time until, after the last holdouts have died, the whole profession will again be practicing under a single, but now a different, paradigm. We must therefore ask how conversion is induced and how resisted (Kuhn, 1970, p. 151).

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Kuhn's question concerning acceptance and resistance provides a useful starting point to think about the relationship between the car and contemporary transport planning. Although application of the paradigm in urban studies is uneven the concept provides a productive lens to understand the ways in which the decisions and actions of professionals and policy makers are driven by a car paradigm.¹

By way of definition, a paradigm is the “fundamental image of the subject matter within a science. It serves to define what should be studied, what questions should be asked, how they should be asked, and what rules should be followed in interpreting the answer obtained” (Ritzer, 1975, p. 157). Viewed in this light, the fundamental image within the science of transport planning is the car. The car defines what should be studied, and subsequently the types of questions that should be asked and addressed.

The car paradigm, however, provides a narrow view of mobility. This narrow view is problematic for a variety of reasons. For example, it provides a limited understanding of travel more generally (Cass, Shove, & Urry, 2004; Friedmann, 1993; Graham & Healey, 1999). It is insufficient to understand the relationship between car-reliant infrastructure and rising social inequality (Dodson & Sipe, 2008) and splintered urban infrastructure (Graham & Marvin, 2002). It fails to appreciate emerging trends—at least in Melbourne—of travel to work patterns shifting from the car to public transport (Mees & Groenhart, 2014). Further, the narrow view does little in the way of resolving issues related to climate change (Banister, 2011).

The 20th century vision of limitless car mobility has yet to be realised, and perhaps will forever remain a chimera that can never be fully achieved. Instead of providing freedom, car-reliant mobility systems generate fragmented human landscapes of “coerced flexibility” (Urry, 2004, p. 36). And instead of providing greater accessibility, car-reliant travel splinters urban landscapes, encouraging “gradual privatisation of social relations” (Graham & Marvin, 2002, pp. 118-119). No city has achieved a mobility vision around un-impeded car travel. Even Los Angeles, where nearly one-half of the land is devoted to the car, vast swathes of land have become ‘non-places’ that

¹ Though uneven, discussion of the paradigm in urban studies is not without precedence. Whereas the notion of the paradigm infiltrated the disciplines of history and sociology (Abbott, 1988; McDonald, 1996; Skocpol, 1984), Kuhn's impact on urban studies is less certain (Friedmann, 1987, chapter 2; Healey, 1996; Huxley & Yiftachel, 2000; Innes de Neufville, 1983). For example, in contrasting transport planning between Toronto, Canada and Melbourne, Australia, the term paradigm is used extensively but in absence of Kuhn's work (Brindle, 1992; Kenworthy & Newman, 1994; Mees, 1994). In critiquing the rationale comprehensive model, Kuhn and paradigm are mentioned together (Baum, 1996; Dalton, 1986), as well as separately (Alexander, 2000).

are not urban, rural, local nor cosmopolitan (Sheller & Urry, 2000, p. 746). However, focusing attention on how to reduce car travel neglects to examine an even larger policy problem facing transport planners; the need to reduce travel more generally.

Recent studies in the UK (Bradshaw, Kemp, Baldwin, & Rowe, 2004), North America (Bullard, Johnson, & Torres, 2002) and Australia (Dodson, Gleeson, & Sipe, 2004) have begun connecting issues related to socially disadvantaged communities with car-reliant suburban developments. Interwoven with this line of inquiry are issues of peak oil, climate change and sustainability. The confluence of this discussion has gained prominence in scholarly debates under terms such as urban sustainability, urban resilience and adaptation (Leichenko, 2011; Vallance & Perkins, 2010).

In terms of car travel and fossil fuels, Australia's cities share basic similarities and therefore problems with their UK and North American counterparts. In Australia, the transport sector contributes about 12% of Australia's greenhouse gas emissions (BTCE, 1994, 2002), roughly in line with comparison countries (IPCC, 1990, 2012). Of the travel modes comprised in the 12% of emissions, car travel generates the largest portion of emissions. Intertwined with sustainability is the growing realisation of a need to "climate-proof" urban settlements (Campanella, 2006; Gleeson, 2008). Creating resilient urban societies involves rectifying splintered urban infrastructure and technologies (Graham & Marvin, 2002). For example, splintered urban infrastructure systems based on car travel exacerbate a household's vulnerability when collectively measured against mortgage, petrol and inflation risk (Dodson & Sipe, 2008).

In Australia, capital cities are at a "crossroads", where policy has yet to make stronger headway towards reducing car travel, but where a "revival" of public transport patronage clearly suggests the potential for a "radical reversal" in travel patterns (Mees & Groenhart, 2014, p. 74). In Melbourne, the increase in single-occupant motorists commuting to work has been partly supported with the construction of more land-kilometres of freeways since 1976 compared with other Australian cities (Mees & Groenhart, 2014). Table 1.1 reflects the total number of journey-to-work trips for Melbourne and Table 1.2 depicts the relative percentage of trips by mode.² Whereas Table 1.1 highlights the car's dominance; Table 1.2 indicates that, for at least commute travel, such dominance has stabilised or is in decline relative to the other travel modes.

² Source material derived from (Mees, 1995; Mees, O'Connell, & Stone, 2008; Moriarty & Mees, 2005) and 2011 census.

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Both tables indicate the 50-year growth and reliance on the car for work travel, which since 2000 has been relegated to Melbourne's freeways (VicRoads, 2012b).

Table 1.1: Comparison of journey to work, 1951–2011 (total numbers)

	1951	1964	1981	1991	2001	2006	2011
Train	152,800	146,653	113,001	103,237	118,547	142,359	190,035
Tram	130,000	88,563	58,178	38,218	30,444	33,462	42,397
Bus	51,800	59,571	51,466	37,635	19,654	20,900	29,080
Bicycle	54,300	15,531	13,768	12,068	12,837	18,909	25,652
Car	95,500	416,984	814,449	880,792	1,031,997	1,106,172	1,228,558
TOTAL	484,400	727,302	1,050,862	1,071,950	1,213,479	1,321,802	1,515,722

Table 1.2: Comparison of journey to work, 1951–2011 (percentages)

	1951	1964	1981	1991	2001	2006	2011
Train	32%	20%	11%	10%	10%	11%	13%
Tram	27%	12%	6%	4%	3%	3%	3%
Bus	11%	8%	5%	4%	2%	2%	2%
Bicycle	11%	2%	1%	1%	1%	1%	2%
Car	20%	57%	78%	82%	85%	84%	81%

To summarise, striving to unravel issues stemming from the car's multifaceted nature in urban society represents 'normal' transport planning. Problems are tackled within a framework of assumptions that implicitly or explicitly accept the car as normal. Persistent and growing concerns confronting professionals and policy makers today call into question the dominant car paradigm. Increasing car travel, coupled with environmental issues, suggests the need to create resilient cities capable of withstanding changing climates. This calls into question policy agendas that outline an incremental approach to destabilising the car paradigm. For instance, the premise that mass mobility leads to mass accessibility is now largely discredited by scholars (Banister, 2005; Graham & Marvin, 2002, pp. 117-121; Urry, 2008, pp. 278-285). Further, instead of "ready-made solutions" to destabilise the car paradigm, transport planners face a "thicket of thorny institutional and implementation problems" (Cervero, 1986, p. 404). Yet, approaches to resolving the car's place in urban society remain grounded within the dominant car paradigm. As such, addressing the car's role in urban society remains a pressing issue, yet one of the most difficult to resolve (Dennis & Urry, 2009; Sheller & Urry, 2000). Anomalies therefore identified within professional and academic circles strongly suggest that addressing the car head-on, is inadequate

to highlight how professionals and policy makers can transition urban societies towards a new, more sustainable mobility paradigm (Banister, 2005, 2008).

1.3 The mobilities paradigm

This research is therefore situated within a 'mobilities paradigm' (Urry, 2008). Urry (2008, pp. 44-54) identifies 12 interdependent features that define the mobilities paradigm. The features include aspects of travel itself, which are increasingly more intense, fast and geographically expansive, but which rely on, and are facilitated by, 'immobile' obdurate material worlds and mobility systems that linger over time with a powerful spatial fixity. Thus, the term mobility encapsulates *both* animate and inanimate elements.

Categorising contemporary mobility challenges as the intersection of animate and inanimate elements provides for a conceptually nuanced picture of very real problems facing professionals and governments. Sheller and Urry (2006b, p. 210) take care in declaring that the mobilities paradigm does not represent a new "grand narrative of mobility, fluidity, or liquidity", but instead it suggests a "set of questions, theories, and methodologies rather than a totalising or reductive description of the contemporary world." The mobilities paradigm builds on separate and distinct disciplines, such as sociology and geography. For example, Hägerstrand (1970) established a research agenda for viewing mobilities in their space-time context (e.g. space and time). Wagner (1972, p. 100) highlighted how mobilities were the product of actors interacting with their built and natural environments. Relph's (1976) phenomenological study of place revealed the embodied importance of space. Lefebvre (2010, pp. 404-412) stressed how power and dualistic conceptualisation of space would always result in unequally distributed space.³ Ellis (1978) theorised road space as exterior city rooms that afforded human perception to feel the volume of urban space. There are clear links between these ideas and theories developed during the 1970s and those advanced by Urry regarding a mobility turn in social science.

The essence of the mobilities paradigm is that complex mobility challenges that face professionals and governments today are the product of dynamic social, professional and political forces as well as static and powerful mobility systems (Urry, 2008). Yet, such powerful mobility systems are in essence, inanimate. How can inanimate stuff

³ *The Production of Space* was first published in 1974, but not translated into English until 1991.

shape the actions and decisions of transport planners? As will be discussed in Chapter 2, answering this question involves engaging with theories of materiality (Latham & McCormack, 2004; Miller, 2005; Pickering, 1995). Consequently, rather than focus on the car, this thesis seeks to understand the ways in which transport planners (i.e. animate) allocating road space (i.e. inanimate) is constrained and constituted.

In thinking about road space allocation, one might expect to begin by examining existing academic literature pertinent to the topic of transport planning. One immediately finds this route to be problematic for a variety of reasons. First, as we see later in this chapter, the ambit of transport planning is broad, making defining transport planning a difficult task. The term urban studies is therefore introduced as it covers transport planning from a variety of angles related to policy, practice and governance. Second, as we see in Chapter 2 urban studies draw different theories from academic disciplines such as geography and sociology, or economic, political or organisational studies. This in turn results in divergent theoretical accounts for understanding how transport planning practice is constrained and constituted. Third, road space allocation is discussed principally in transport planning in relation to specific transport programmes and road measures (see below). The mobilities paradigm provides a world view to broaden the topic of road space allocation. This ensures congruity between elements included in this analysis with those found in urban studies, but also allows for examining particular aspects of transport planning in detail.

Drawing from studies of science and technology can therefore advance and add materially to what the transport literature has previously provided on the topic of road space allocation, in areas which been suggested by others (particularly in non-specific transport planning studies), but which confirmatory explorative research had not yet been conducted. As already identified, incorporating inanimate elements into analysis remains a major gap in studies of transport planning. Examining how animate and inanimate elements intersect has been an overt ambition within the science and technology study literature (Biagioli, 1999; Hackett, Amsterdamska, Lynch, & Wajcman, 2008; Jasanoff, Markle, Petersen, & Pinch, 1995). Coutard and Guy (2007) commented that there is little cross-pollination between studies of science and technology and urban studies. As several scholars have noted, the gap is notable as it is exactly because concepts which pay particular attention to how society shapes technology and vice versa, that the literature has much to offer urban study scholars (Coutard & Guy, 2007; Gieryn, 2002; Hommels, 2005).

One specific stream contained within studies of technology and science is the sociology of scientific knowledge. Evans, Guy and Marvin (1999) have advanced the argument that adopting insight from sociology of scientific knowledge can help reposition complex urban infrastructure debates. The principal aim within sociology of scientific knowledge studies is to describe, understand and explain science as a socially constructed activity (Barnes, Bloor, & Henry, 1996). As will be demonstrated in Chapter 2, drawing from sociology of scientific knowledge provides a constructive lens to analyse road space allocation from historical and contemporary settings, and to incorporate materiality into analysis. Only recent historical urban studies—which specifically draw from studies of technology and science—are found to incorporate materiality into analysis. Such studies by their nature are historical. Thus, a need remains for examining road space allocation within contemporary settings. Drawing insight from sociology of scientific knowledge assists in resolving this need.

Studies of scientists guided by sociology of scientific knowledge reveal how scientists determine what constitutes a fact as being largely derived from a realist account of the world (Barnes, et al., 1996; Pickering, 1995). Such lines of inquiry are found to provide fruitful ways to understand the science of transport planning. For example, from a professional's standpoint, there is little to gain by labelling a car travelling through a street intersection as a socially constructed event. Instead, the event is understood as a fact, able to be observed and tabulated. Thus, there is little difference between examining physicists testing ideas around gravity or the speed of light, from examining transport planners testing out new tram platform designs. Yet, from a research perspective, examining such situations can reveal how the situations further the “pragmatic concerns” of a professional culture that helps sustain the “coherence, consistency and simplicity” of the profession (Barnes, et al., 1996, pp. 83-84).

1.4 Road space allocation

1.4.1 Defining road space allocation

The term ‘road space allocation’ is used extensively in this thesis, and is defined and understood in this study as allocating road space to resolve particular competing needs, uses and desires over the best use of road space. As will be discussed in detail in Chapter 2, the enactment of allocating road space emerges from how four the elements of governance, organisational conventions, transport planning and infrastructure intersect. The mobilities paradigm provides a means to examine how the allocation of road space furthers the pragmatic concerns of the transport planning

profession. As such, the term road space allocation emphasises an important difference between use and allocation of road space.

How road space is used and by whom is complex and often falls short of a policy's original intent. For instance, bicyclists still run red lights; motorists still ignore road rules, and pedestrians still cross streets outside of zebra crossing. Road space allocation reflects the explicit intent of transport planners over the appropriate use of road space. For example, to coincide with the Australian Commonwealth's annual five-year census, during the 1970s, the City of Sydney Council began surveying the commercial floor space within its council boundaries (Hu, 2014). The capital cities of Melbourne and Adelaide have collected similar land use and employment data for several decades (Ley, et al., 2012). Every five years, surveyors walk through over 27,000 buildings that populate Sydney's CBD to observe how businesses allocate their respective floor space. Although buildings are obdurate edifices, and the fabric maybe relatively unchanged from the previous survey, where businesses choose to allocate a meeting room or filing cabinet, and whether a floor plan is open-plan or semi-partitioned, reflects a business' explicit intent in how to operate. Similarly, the decision to narrow or widen a bicycle lane or extend clearways, reflect the explicit policy intent of how a government chooses to allocate road space. Alterations to office spatial arrangements largely stem from changing business practices and conventions, and/or societal changes regarding work. Similarly, changes in road space allocation reflect societal changes toward the bicycle, or cultural changes, such as the rise in café culture, where road space is re-fashioned as hubs for commercial and social activity. Consequently, acceptable use of road space at the turn of the 20th century is in large part quite different to what is acceptable today. This situation results in transport planners resolving different ongoing tensions which are discussed in Chapter 2.

1.4.2 How road space allocation is understood under a car paradigm

In making a professional transition from the dominant car paradigm to another yet as un-specified paradigm, transport planners really only have two viable alternatives: constructing more road space for more modes of travel or allocating existing road space to give specific modes priority and/or to reduce travel. It is this second alternative that drives the research programme for this thesis. As we see in Chapter 2, transport planners have historically pursued the first alternative of constructing more roads to meet ever-increasing travel demand. Yet, once constructed, a road's space dimensions are set, bringing questions concerning allocating the space to the fore.

Karndacharuk, Wilson and Dunn's (2014) detailed summary of approaches to allocating road space include notable examples such as *Woonerf*, traffic calming and local area traffic management. These examples are often informed by larger programmes such as Travel Demand Management (TDM), Transportation System Management (TSM) and Intelligent Transportation Systems (ITS), to name just a few. These programmes were created to do more with less space (Vuchic, 2000). Initially, the aim of TDM was to influence travel options and to reduce road congestion (Meyer, 1999). TDM initiatives and measures targeted *individual* travel behaviour through different local, regional or national policy levers (Ison & Rye, 2008). Focus on individual travel neglects important time-space relationships orchestrated by existing transport networks (Cass, et al., 2004). Importantly, TDM implicitly—if not explicitly—accepts the car as dominant by providing balanced outcomes for all modes. This benefits car travel even when policy objectives dictate otherwise (Vuchic, 2000).

Contemporary TDM programmes have begun to address such limitations to varying degrees. This has helped transport planners implement 'sustainable' transport policy (Banister, 2005), or what Owens' (1995) refers to as 'getting the price right' and 'the planning panacea'. Central to such successes is applying a suite of carrot and stick measures. Stick policies (disincentive) pull motorists out of their car (i.e. reducing car parking provision) and carrot policies (incentive) push drivers into non-car modes (i.e. increase public transport service) (Bonnell, 1995; Meyer, 1999). Cervero (1998, Chapter 17) reiterated the importance for pursuing stick policies as one of 15 lessons drawn from his international case study of public transport cities. Vuchic (2000, pp. 238-248) provides theoretical support for such studies. In summary, Vuchic underscores policies aimed at altering car-reliant mobility patterns must include incentives to offset more politically contentious disincentives (2000, p. 240, see diagram 6.3 for simplified illustration). Investigations into the validity of packaging push-pull measures with the intent of reducing car travel remains conflicting (Bonnell, 1995; Cervero, 1998; Meyer, 1999).

In this thesis, TDM is encapsulated under a demand management stance. This stance is defined as the destabilisation of the dominant car paradigm. As we see in later chapters, analysing road space allocation reveals destabilisation to be implicit and explicit as well as intentional and unintentional.

1.4.3 How road space allocation is understood under a mobility paradigm

Focusing on road space allocation draws attention to cumulative impacts generated from two trends occurring in urban society. On the one hand, the city is now regarded as the primary settlement form, accommodating half the world's population; a trend expected to continue (Vallance & Perkins, 2010). On the other hand, a collapse in transport planning ideology has resulted in scholars and practitioners generally concurring that complex mobility challenges simply cannot be resolved with additional road capacity (Banister, 2005, 2008). The confluence of these trends has resulted in an active critical debate as to how to proceed with a policy agenda capable of reducing car travel (Graham-Rowe, Skippon, Gardner, & Abraham, 2011), retrofitting existing car-reliant mobility infrastructure (Ewing, 2008; Gan, 2003), and minimising the need for mobility more generally (Mackie, 2008; Metz, 2008). As we have seen, in isolation, these policy aims are principally drawn from assumptions, questions and concerns grounded within the dominant car paradigm. Thus, these policy aims start with a very narrow view of mobility.

Broadening our view of mobility requires understanding how animate and inanimate elements intersect in transport planning practice. The mobilities paradigm affords conceptual scope that accounts for animate and inanimate elements. This in turn opens up new productive research avenues to examine transport planning in non-traditional ways. Subsequently, an opportunity exists to develop a conceptual model to analyse road space allocation and is explained in Chapters 2.

By way of summarising, road space allocation is conceived in this thesis as emerging from the intersection of four constitutive elements. The intersection is not known in advance, but emerges during the allocation of road space. How and why elements intersect reflects actors seeking to resolve road space allocation tensions identified in Chapter 2. Examining how tensions are resolved helps reveal how the practice of transport planning is constrained and constituted.

1.5 Scope and significance

This research investigates elements that determine and shape how professional transport planners allocate road space, within the context of broader planning and construction of mobility infrastructure. It is therefore acknowledged that there are other factors that comprise road space allocation such as the physical sharing of space (Karndacharuk, et al., 2014), road space acting as both the site for communication

linkages and transaction sites (Roberts, Lloyd-Jones, Erickson, & Nice, 1999), and that advancing such challenges and resolving competing priorities involves community participation and advocacy (Fyfe, 1998; Marshall, 2005; Moudon, 1991). Though these elements are acknowledged and discussed to some degree in this thesis, focus remains in analysing how transport planning, governance, organisational conventions and infrastructure intersect in road space allocation.

In this thesis, transport planning/planner is defined as professionals responsible for allocating road space within metropolitan Melbourne. The rationale for this definition is discussed in Chapter 2. The definition does not reflect traditional definitions of transport planning. Given the encompassing ambit of transport planning, the unique definition is not found problematic. For example, transport planning requires a broad array of tools, skills and competencies (Banister, 1994). This in turn makes educating future transport planning professionals a difficult task (Mateo-Babiano & Burke, 2013; Zhou & Schweitzer, 2009). A similar issue with educating future urban planners can also be made (Thompson & Maginn, 2012). The challenges in developing an appropriate educational curriculum for transport planning highlight issues related to definition. Early attempts to define transport planning often applied a distinctive engineering perspective (Leibbrand, 1970, p. 6). A more recent definition advanced by the UK Transport Planning Society defines transport planning more broadly:

Transport planning is about preparing, assessing and implementing policies, plans and projects to improve and manage our transport systems. There is a need for transport planning on a local, regional, national and international level. It can involve understanding the link between transport and the future shape of our towns and cities, the economy, the environment and climate change, and the quality of life. It is also about changing people's attitudes towards travel to encourage use of alternatives to the private car (TPS, 2013).

Although succinct, the definition masks deeply-interwoven elements that constitute mobility (Dennis & Urry, 2009; Sheller & Urry, 2000). Whereas meeting existing and future mobility pressures underpins the dominant car paradigm, deciding to suppress and modify mobility systems is a more recent and deeply contested stance (Evans, et al., 1999). Reference to differing geographical levels in the definition further underscores competing needs. Resolving competing travel needs has historically relied on operationalising the conventional road classification hierarchy (discussed in Chapter 2). This has resulted in conceptualising two polarised types of road space: space for circulation, and space for work, play and living (Marshall, 2005). This premise neglects preserving the traditional role that urban streets have historically played as

both a space for movement and place for daily urban life. In contrasting the terms transport and city, the definition highlights differing professional responsibilities, such as car parking provision. Car parking is often the responsibility of local government, not regional or state government, and whose delineated responsibility in practice often falls within the purview of both land-use and transport planning. The last sentence in the definition underscores the car's dominant role in urban society. As we have seen, the car paradigm provides a narrow view of mobility. Consequently, the definition of transport planning used in this thesis is found to accord with how mobility is generally understood within the mobilities paradigm.

Understanding how road space is allocated provides a useful exploratory research topic commiserate to a new framing and approach (detailed in Chapter 2) directed at understanding transport planning practice. Reframing transport planning can assist researchers, practitioners and policy makers interested in destabilising the dominant car paradigm that drives contemporary urban policy. Though this thesis concentrates its focus on how road space is allocated within metropolitan Melbourne, findings derived from the study can provide valuable insight for wider audiences. Expanding the analytical parameters for viewing mobility involves moving across a wide range of more specialised bodies of literature. In Chapter 2, the urban studies literature is interrogated by an analytical lens based on drawing insight from studies of technology and science. Drawing from this specific body of literature is revealed in this thesis to advance and add materially to the transport planning literature, in areas which been suggested by others (principally in non-transport planning studies), but which confirmatory explorative research has yet to be conducted.

Examining how transport planners allocate increasingly constrained road space can enhance our understanding of the strengths and weaknesses of current approaches. This in turn can provide a valuable contribution to transport planning. It will benefit Australian state and local governments by revealing the effectiveness of current processes and decision-making frameworks used in transport planning. Additionally, findings from this research can provide a deeper understanding into a paradox often identified by scholars. Although scholars and professionals generally accept engaging complex mobility challenges must be based on achieving more sustainable-oriented outcomes, such acceptance remains scripted by processes that privilege the car.

The aim of this thesis is therefore to contribute new knowledge to our understanding of how professional transport planning practice is constrained and constituted. This in

turn draws attention to issues of agency and structure. In its most rudimentary form, agency refers to free will, as 'do urban and transport planners have the capacity or opportunity to marshal professional experience and knowledge to utilise resources and make change' (Forester, 1989; Grant, 1994; Hoch, 1994). Conversely, structure constrains agency through overt political means or more subtle means such as professional job description. Yet, lack of engagement with theories of materiality in transport planning studies result in narrow picture of how professionals act and make decisions (Vreugdenhil & Williams, 2013). Though inanimate objects don't have agency in the sense of human intentionality, accounting for materiality has revealed how the contours of material agency emerge in daily work (Pickering, 1995). Including materiality into the analysis of road space allocation therefore can reveal constraints that limit transport planning practice, and reveal opportunities where more malleable processes are susceptible to destabilising the dominant car paradigm.

1.6 Research question

Urban scholars contend that the 'range of potential policies' to create less car-reliant mobility systems is well documented and largely accepted by scholars and professionals, and that attention should shift to examining how to implement policy (Banister, 2005). Analysing road space allocation can highlight real boundaries that delineate professional responsibilities. This can reveal limitations of governance, policy frameworks and professional knowledge geared towards transitioning to a new sustainable mobility paradigm. A pressing need therefore remains for research to contribute new knowledge of how transport planning practice is constrained and constituted. To address this need, this research is guided by the primary thesis question: *What can the practice of road space allocation tell us about the significant determinates that constrain and constitute transport planning in transitioning towards a non-car paradigm of professional practice?*

In order to address this question, the following objectives have been developed:

- to identify and examine rules that govern and guide road space allocation
- to explore professional norms and conventions that facilitate and constrain road space allocation;
- to analyse how infrastructure influences road space allocation; and
- to analyse when, why and how a demand management stance has been applied in road space allocation.

This research examines how road space is allocated in Melbourne, Australia. As such, it is an applied empirical investigation of historical and contemporary problems and

professional practice. A case study methodology is used to examine how road space is allocated in Melbourne. Chapter 3 outlines the rationale for the methodology along with the set of research methods applied to examine road space allocation.

Researching professional problems is critical to begin addressing complex mobility challenges, as examining practice can generate new insight and knowledge useful to professionals (O'Leary, 2005). Critical attention to the "situated particularities" of professional practice can reveal the "human capacity for social learning and for discovery through experience" (Healey, 2009b, p. 287). This study assumes professional transport planning is the product of actors negotiating and interpreting meanings and situation (Blaikie, 1991; Bryman, 2008). Thus, social reality is not a thing to be interpreted; "it is those interpretations" (Blaikie, 1991, p. 120). Consequently, methods chosen to examine road space allocation are not based on triangulating data. Instead, this study applies a set of methods with the explicit purpose of constructing a richer and more complex picture of mobility. Specifically, these methods include material drawn upon from a critical examination of scholarly literature, a document analysis of archival materials and government policy and legislative materials, face-to-face interviews with over 60 practicing and retired transport planners and participant observation of a transport planning exercise.

1.7 Thesis structure and summary

This chapter presented the research topic and context for this study. A case was made for viewing the science of transport planning as being driven by a car paradigm. Following on from this, mobility was discussed not from the perspective of the car, but from road space allocation. With the context and justification for this thesis established, attention turns to critically examining the urban studies literature to identify conceptual elements useful to analyse road space allocation.

Chapter 2 draws from sociology of scientific knowledge in particular, and studies of science and technology more broadly, to interrogate the urban studies literature. The examination results in the four conceptual elements of transport planner, governance, organisational convention and infrastructure as constituting road space allocation. Further, the tensions of liveability, spatiality, capacity and network are found to explain how and why the elements intersect. Successful identification of the elements results in developing a conceptual framework to analyse road space allocation. Road space allocation is understood to emerge from the intersection of four constitutive elements. How elements intersect occurs during the resolution of one or tensions that make

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allocating road space challenging. With the elements of road space allocation identified, and conceptual framework to theoretically understand how the elements intersect developed, attention turns to outlining a methodology and set of research methods to empirically analyse road space allocation.

Chapter 3 outlines the research methodology and methods. Methods include a critical examination of scholarly literature (as conducted in Chapters 1 and 2), a document analysis of archival materials and government policy and legislative materials, face-to-face interviews and participant observation of a transport planning exercise. With the programme of research guiding this thesis now fully flushed out and explained, attention turns to identifying and examining rules that govern and guide road space allocation.

Chapters 4 and 5 establish the wider context in which to understand road space allocation, and set the scene for the remaining thesis chapters. Chapter 4 explores the governance for road space allocation. Examining the history of governance of urban mobility in Melbourne reveals a compelling picture of remarkably stable institutional structures. These structures in many ways remain largely unchanged from pre-car ways of governing, with similarly stable divisions of professional competencies and fields of responsibility. Chapter 5 shifts attention to examining on-street motor car parking controversies. The chapter examines the ways in which institutions and professions adapted to changing technologies and social expectations, particularly around the emergence of the car. Professional norms and conventions developed to help adapt to new travel patterns are shown to occur through incremental shifts, which are strongly linked with existing competences, professional norms and governing arrangements.

Chapters 6, 7 and 8 examine specific road space controversies in more detail. Evidence from interviews with transport planners is drawn upon to support each chapter. Chapter 6 examines and analyses different tram priority projects and trials. Tracing different projects brings infrastructure to the fore, and highlights how infrastructure influences and shapes road space allocation. This provides a means to identify re-occurring themes of less or more mobility-centred programmes for allocating road space in Melbourne. In particular, uptake of a demand management stance is found to be deeply contingent due to unstable and ever-changing mobility visions developed by different state governments. This provides insight into greater reliance

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on—though professionally and institutionally bounded—the trend for increasing discretion of transport planners.

Chapter 7 examines transport planning conventions around hierarchically arranging road space. Resolution to road space allocation tensions identified in Chapter 2 concerning liveability and network are examined in relation to the operationalization of the hierarchy typology. These tensions and concepts are further examined in more detail in relation to strategic processes and decision-making frameworks used in road space allocation. Strategic processes and decision-making frameworks created and employed in planning practice are revealed to frame and limit debate. As such, examining when and why decision-making frameworks have been applied to allocate road space provides insight into the extent professionals build from prior professional studies, as well as support or attempt to destabilise the dominant car paradigm.

Chapter 8 summarises findings from a participant observation of a strategic transport planning exercise. The exercise helps reveal how transport planners balance and reconcile competing local and metropolitan road space needs. The chapter provides a closer grained analysis of the consequences—for action and the limits of action—with respect to professional capacity, experiences and practices in road space allocation. Examining how the network tension is resolved helps to reveal tacit and embedded knowledge required to turn generic rules and strategies into practice are critical to implementing meaningful and implementable road measures aligned with a demand management stance.

Chapter 9 examines the key findings from the research. Findings are first examined in relation to the urban studies literature. The discussion highlights a number of insights which enhance and contribute new knowledge to our understanding of how professional transport planning practice directed at facilitating more sustainable travel outcomes is constrained and constituted. These insights are elaborated on in relation to different road space allocation tensions.

Chapter 10 concludes the thesis, drawing together the key findings of the research, based on addressing the primary thesis question and core thesis objectives. What the key findings mean for destabilising the dominant car paradigm and for how professional transport planning practice directed at facilitating more sustainable travel outcomes is constrained and constituted is elaborated.

Chapter 2 – Elements of road space allocation

The mobilities paradigm opens up more productive research avenues to understand mobility more generally and road space allocation in particular. Yet, questions remain as how to conceptually and empirically understand and analyse road space allocation.

This chapter therefore critically examines the urban studies literature to identify key conceptual elements applied in the literature to examine road space allocation. The chapter has two primary aims. The first aim is to identify the constitutive elements of road space allocation, and the second is to understand why the elements intersect. The chapter draws from sociology of scientific knowledge in particular, and studies of science and technology more broadly, to interrogate the urban studies literature.

The chapter begins by identifying core conceptual elements applied in sociology of scientific knowledge. This helps to conceptualise road space allocation in both historical and contemporary settings, as well as incorporate materiality into the analysis. Attention then turns to determining how to cut across the urban studies literature. The question is not what to read, but how to read the literature. Three intellectual waves that science studies have travelled identified by Collins and Evans (2002) provide an analytical lens to interrogate the urban studies literature. This in turn helps to identify transport planning, governance, organisational conventions and infrastructure as the constitutive elements of road space allocation. With the conceptual elements identified, the chapter turns to addressing its second aim.

The second aim of this chapter is to understand why identified elements intersect. As we see in the first half of this chapter, historical urban studies provide convincing evidence that resolving mobility challenges are not solved, but resolved over and over again. Re-examining the urban studies literature reveals that transport planners can be viewed as resolving different ongoing tensions: liveability, spatiality, capacity and network. The tensions provide insight to understand why the constitutive elements of road space allocation intersect. Successful identification of elements results in developing a conceptual framework to analyse road space allocation. With the elements of road space allocation identified, and conceptual framework to theoretically understand how the elements intersect developed, attention turns to outlining a methodology and set of research methods to empirically analyse road space allocation. This task is taken up in Chapter 3.

2.1 Repositioning the urban infrastructure debate

Over the past decade, Robert Evans, Stephan Graham, Simon Guy and Simon Marvin have developed a research agenda centred around understanding how different planning professions in the UK address complex issues associated with urban infrastructure implementation and management (Evans, Guy, & Marvin, 2001; Evans & Marvin, 2006; Graham & Healey, 1999; Graham & Marvin, 2002; Guy & Marvin, 1995; Marvin & Guy, 1999). Re-theorising traditional transport planning concepts such as streets, sewers and housing led the scholars to look outside of more traditional urban studies literature such as the sociology of scientific knowledge.

Evans, Guy and Marvin (1999) suggest that adopting insight from sociology of scientific knowledge can help reposition complex urban infrastructure debates. Central to their argument rests two core propositions: one, scholars need to shift from a neutral to a commitment stance; two, the production and management of urban infrastructure networks has shifted from a predict-and-provide to a demand management approach. Both of these propositions are briefly examined.

The first proposition advanced by Evans et al (1999, pp. 107-108) centres on the epistemological legacy that continues to inform much of the sociology of scientific knowledge literature. A similar discussion can be found in Collins and Evans (2002). In short, seminal studies in the sociology of scientific knowledge literature, such as those conducted by Barnes (1974), Bloor (1976) and Collins (1985), sought to demonstrate that their research was sufficiently robust, yet novel compared to traditional sociology and studies of science and technology. A neutral stance arose from their desire to remain completely detached in their investigations. The stance was based on a desire to convincingly demonstrate how models designed and used by scientists, were in-fact socially constructed. In reviewing these seminal studies, Evans et al (1999, pp. 107-108) proposed shifting from a neutral stance, focused on examining the content of knowledge claims, to a commitment stance, focused on analysing the “process through which knowledge claims are elicited and evaluated” (Evans, et al., 1999, p. 109).

This thesis adopts a commitment stance. In Chapter 1, a case was made for viewing the science of transport planning as being driven by a car paradigm. It was argued that paradoxically, developing a policy agenda around the car starts with a narrow view of mobility. Clearly a need remains for destabilising the dominant car paradigm and transitioning to a more sustainable mobility paradigm (Banister, 2005, 2008).

Consequently, this thesis assumes that destabilising the dominant car paradigm involves adopting a commitment stance.

Advancing a commitment stance is premised on the scholar's second proposition. Evans et al (1999, pp. 105-107) contend how infrastructure is planned for, managed and forecasted has shifted from a predict-and-provide to a demand stance. The shift in stances reflects a breakdown identified in both professional and academic planning circles, as to the deeply problematic if not impossible ability to resolve complex urban infrastructure challenges, by constructing additional infrastructure. It is this second proposition where this thesis departs from Evans et al. As we see in the second half of this chapter, accounts of how the transport planning profession came into being are often based on a linear narrative of the profession in relation to the car. This linear account is problematic, particularly in light of contemporary practice, where questions remain to what extent the profession has adopted a demand management stance.

Yet, returning to Evans et al.'s (1999) main argument, there is merit in adopting insight from sociology of scientific knowledge to reposition contemporary urban policy debates in novel ways. Specifically, drawing insight from science and technology studies can help to interrogate urban studies in a way that productively contributes to thinking about the topic of road space allocation. Understanding this point involves examining two specific streams of thought contained in studies of technology and science. The first stream involves identifying different conceptual elements used in sociology of scientific knowledge in examinations of scientists at work. The second stream involves examining three waves of intellectual debate within studies of science.

Sociology of scientific knowledge takes scientific ideas, theories, methods and experiments as the core subject of analysis (Pinch & Bijker, 1984). A core objective is to describe, understand and explain science as a socially constructed activity (Barnes, et al., 1996; Collins, 1983). In examining this body of research, three broad and crude conceptual elements can be identified. The elements are found useful to help interrogate the urban studies literature for similar elements.

One of the achievements of sociology of scientific knowledge was to bring actors (i.e. agency) back to the fore in analysis (Pickering, 1995, pp. 9-20). Science studies draw attention to how the construction and use of scientific knowledge are the product of human agency's active engagement with structure (Barnes, 1974; Collins, 1985; Latour & Woolgar, 1986; Pickering, 1995). Therefore, as an actor, the 'scientist' remains a core conceptual element within science studies. Similarly, application of the term

culture in science studies denotes a range of resources such as methods, processes and scientific specialisations. In turn, scientific culture represents structural components that guide and shape the actions and decisions of scientists. Therefore, 'scientific culture' remains a core conceptual element within science studies. And finally, increasing emphasis in science studies to theorise agency provided avenues to examine materiality. A central premise underpinning theories of materiality is that things (i.e. objectives, technology) have agency (Latham & McCormack, 2004; Miller, 2005). Materiality in sociology of scientific knowledge can crudely be generalised along a spectrum (Pickering, 1992b). At one end, analytical focus accounts for material agency in relation to the wider field of human agency. At the other end of the spectrum, analytical focus seeks to transcend the duality of subject (i.e. human) and objective (i.e. non-human) (Latour, 2005; Latour & Woolgar, 1986). Therefore, materiality remains a core conceptual element within science studies.

Table 2.1 summarises how the elements of scientist, scientific culture and materiality have been applied in more detailed studies. The labels are crude but provide a practical means to begin thinking about the topic of road space allocation. For example, we can see that scientist can be interchanged with practitioner; scientific culture interchanged with governance; and materiality interchanged with infrastructure.

Table 2.1: Conceptual elements identified from sociology of scientific knowledge

Element(s)	How element is understood	Literature
Scientists	Actors involved in science	Barnes, Bloor & Henry (1996) Collins & Evans (2002)
Scientific Culture	The interests and methods employed by scientists constrained, informed or influenced by place in organisation	Pickering (1992b) Shapin (1982)
Materiality	Problems can and do arise that require scientists to resolve by engaging with machines, contours not known in advance.	Pickering (1995)

Yet, determining how each element is accounted for in urban studies conceptually and empirically, requires delineating a meaningful boundary around the literature as well as a method to interrogate the literature. In tracing intellectual debates in science studies, Collins and Evans (2002) identify three intellectual waves that studies of science have travelled. A discussion of these waves provides a means to delineate a boundary around, as well as interrogate, the urban studies literature.

Collins and Evans' (2002) examination into different intellectual waves of debate within studies of science highlights issues related to extension and legitimacy. Extension refers to questions regarding how far participation in technical decision-making should

be extended. Legitimacy refers to concerns regarding the need to widen the scope of involvement in technical decision-making.

The first wave of science studies never addressed concerns with extension, and remained largely unaware of issues related to legitimacy (Collins & Evans, 2002). Epistemological concerns adhered to an objectivistic ontology, specifically positivism (Lincoln & Guba, 1985). Consequently, the actions and decisions of scientists were predicated on self-interest and calculative rationality (Barnes, 1995). Based on adopting a neutral stance, the second wave directly interrogated issues of legitimacy - but has only more recently engaged extension (Collins & Evans, 2002). Studies such as Barnes (1974) and Collins (1985) took great strides to ensure their investigations remained neutral from matters such as policy. Adopting a neutral stance was believed to convincingly demonstrate how scientific knowledge was socially constructed. In accepting solutions outlined in the second wave, Collins and Evans develop a third wave research programme aimed directly at issues of extension. Urban studies have similarly travelled through different waves of intellectual debate.

Therefore, by way of summarising, drawing from studies of technology and science productively contributes to thinking about the topic of road space allocation in a number of specific and important ways. From sociology of scientific knowledge, the elements of scientist, scientific culture and materiality provide a way to begin conceptualising how such terms might relate to the field of transport planning. Further, comparing different waves of intellectual debate within studies of science with those found in urban studies can help delineate a boundary around the literature as well as provides an analytical lens to interrogate the literature.

We therefore begin first by examining the core theories that drove different intellectual waves in urban studies. Theories are interrogated through examining exemplar studies of work. The aim is not to cover a comprehensive ground of ideas and arguments, but to pinpoint the core theoretical strands which cut across specialised concerns of policy, practice and governance. This is critical for two reasons. First, the discussion identifies how transport planning has been examined broadly, and what conceptual elements are most often included specifically. Second, the discussion identifies the extent to which theories of materiality are included in analysis. To understand these reasons further, we begin by examining the first wave of urban studies.

2.1.1 Examining different intellectual waves of urban studies

First wave urban studies adhered to an objectivistic ontology, specifically positivism (Lincoln & Guba, 1985). The aim was to gain predictive and explanatory knowledge (Keat & Urry, 1975). In turn, actors are presumed to be predicated on self-interest and calculative rationality (Friedmann, 1987). The core theory driving first wave urban studies examining planning practice or governance was formal rationality as developed by Max Weber (Friedmann, 1987).

Weber distinguished two forms of rationality: formal rationality and substantive rationality. These forms were perceived as contradictory. Formal rationality corresponds to a logical decision-making process, in that an actor's decisions must accord with instrumentally efficient processes and procedures. Substantive rationality refers to "particular social arrangements and their suitability with respect to the declared purposes of the society" (Friedmann, 1987, pp. 97-98). Instrumental rationality views professionals systematically working through logical unbiased steps, where rational actors were perceived as 'the expert'. However, society "is not a logical structure designed by engineers but rather consists of both logical and illogical elements and relations" (Friedmann, 1987, p. 98). Yet, during the first wave of urban studies, the professionalisation of urban and transport planning, as well as core theories informing how to understand and examine such work, was in their infancy. Academics were thus constrained from viewing practitioners as both logical and illogical. This is reflective of early urban studies.

Meyerson and Banfield's (1964) *Politics, planning & the public interest* provides an exemplar of first wave urban studies concerned with both practice and governance. The unquestioned acceptance of Weber's contradictory theorisation of rationality resulted in documenting conflicting evidence. In building on Weber's theory of rationality, Meyerson and Banfield's (1964) study was seminal to both testing, advancing and advocating the rational comprehensive model during the first wave of urban studies (the limitations of the model are discussed in more detail in Section 2.1.2). Meyerson and Banfield (1964, p. 15) explicitly acknowledged that the model represented an idealised construct for analysis and that "real organisations (like real people)... do not make decisions in a "substantially rational manner". Although Meyerson and Banfield (1964, p. 315) identified criticisms toward the model, they concluded it provided a "useful guide" based on the assumption that planning intrinsically contains ends (i.e. goals) to be attained, whether unrealistic or not.

Consequently, adherence to an objectivist ontology theorised actors having agency to the extent that they successfully adhered to the rational comprehensive model.

First wave urban studies concerned with governance were also deeply influenced by political and structural-functionalism theories prominent in political science (Hall & Taylor, 1996). For example, Hunter's (1953) *Community power structure* provides an exemplar of how first wave urban studies examined urban governance. Hunter's study documented a unified elite wielding direct control of the local state. Emphasising politics gave primacy to matters of structure over that of agency held by professionals.

The core theory driving first wave historical urban studies was a theory of "general linear reality" (Abbott, 1988). The theory established a set of methodological commitments and was based on several core assumptions (Pierson, 2004). For example, larger things caused smaller things to change and that the ordering of historical events was not important. The ahistorical theorisation resulted in assuming that as long as conceptual elements were analytically correct and measured correctly, historical ordering and duration made no difference. This resulted in technologically deterministic accounts of urban history (Mcshane, 1994). For example, Warner's (1962) *Streetcar suburbs* reflects an exemplar first wave historical urban study. In documenting the rise of suburbanisation in North America, the study was pioneering in drawing connections between urban society and technology (Misa, 1988). Yet, adherence to technological determinism neglected drawing connections between agent and structural processes in urban development and social relations.

To summarise, first wave urban studies remained informed by positivism. The aim was to gain predictive and explanatory knowledge. Yet, accounts failed to view practitioners as both logical and illogical actors. For example, Meyerson and Banfield's use the rational comprehensive model as the standard to measure professional practice aligned with behavioural theories (Friedmann & Hudson, 1974). This alluded to the importance placed on the actor. In contrast, Hunter's emphasised how politics and elites structured the actions and decisions of professionals. Warner's unquestionable faith of technological determinism ignored tracing any aspect of materiality.

More specific to urban planning, the inability of the rationale comprehensive model to explain the actions and activities of planners led to counter theories of practice (Watson, 2002). This reflects the breakdown of positivism noted in science studies. Central to this break was re-theorising agency and structure, a core philosophical issue

since Marx (Abrams, 1980). Applying new theories to explain and understand professional practices resulted in scholars accounting for personal interests and beliefs. Theories informing second wave urban studies sought to determine how “active subjects make a world of social objects which then... become subjects making us their objects” (Abrams, 1980, p. 7). To understand this point further, we turn to examine the second wave of urban studies.

During the second wave of urban studies, the realisation that professionals held beliefs that shaped their actions sprouted a flurry of normative conceptualisations of practice. An exemplar of second wave urban studies concerned with practice is Paul Davidoff's (1965) ‘Advocacy and pluralism in planning’. Davidoff brought centre issues of agency and normativity. He highlighted how policy is ultimately determined through political debate. Thus, determining “the right course of action” in practice “is always a matter of choice, never of fact” (Davidoff, 1965, p. 331). In building on Davidoff's (1965) idea of the planner as advocate, Klosterman (1978, p. 39) revealed “planners often have strongly felt personal or widely shared professional views on public issues”. Instead of remaining silent on such views, Klosterman (1983) argued combining scientific rigour, the focus of first wave urban studies, with advocacy and normativity. By explicitly emphasising the role of choice, the planner is again brought to the fore in analysis.

Berger and Luckmann's (1971) *The social construction of reality* also shaped second wave urban studies. Berger and Luckmann drew attention to social construction of facts (Innes de Neufville, 1983). Structure was theorised as being internalised by autonomous actors through socialisation. This in turn shaped future rules and standards of social and professional conduct (Harris, 1996). This account of agency developed a more nuanced and realistic picture of planning (Friedmann, 1987).

Central to second wave urban studies concerned with practice was a small group of planning theorists which gave rise to the ‘practice movement’ (Innes de Neufville, 1983; Watson, 2002). Though supported by ideas developed by Berger and Luckmann, the movement stemmed from Krieger's (1974) call to leave the university and examine urban planners in their native work environments. Krieger turned to a wide range of new theories being developed in phenomenology (Schutz, 1972), Wittgenstein's work with language philosophy (Pitkin, 1972) and ethnomethodology (Garfinkel, 1967). In setting out a new research agenda, Krieger's aim was to create a more realistic picture of urban planners in their professional worlds. Yet even in contemporary third wave urban studies, studies applying a practice movement lens continue to focus principally

on urban planning. This in turn questions its applicability to the subject of transport planning. The literature also emphasises professional practice and governance and thus fails to incorporate materiality into analysis.

An exemplar second wave urban study concerned with governance is Dahl and Lindblom's (1953) *Politics, economics and welfare*. Dahl and Lindblom challenged prevailing theories advanced by political scientists such as Hunter. Their study found that instead of powerful elites wielding power, the analysis revealed a "complex tangle of interest groups" (Stone, 2008, p. 36). An important outcome from the study was Dahl and Lindblom advancing a 'pluralist' theory, where governance was theorised around political and policy disputes and required bargaining between multiple interests. Lindblom (1959) later refined his ideas as the 'science of muddling through' the policy development process. The term 'muddling through' reflected poorly defined problems and limited resources professionals encountered. Consequently, structural forces constrained professional action. This resulted in professionals incrementally working through urban problems in an incremental and often disjointed manner.

Mumford's (1955) *Technics and civilization* published in 1935 remains seminal to technology studies (Staudenmaier, 1985). Mumford outlined a complex interpretation of western civilisation and technology. However, the linear reality theory's dominance resulted in first wave historical urban studies neglecting Mumford's work (Lubove, 1967). Mumford's influence on historical studies therefore didn't begin until the second wave. Ellul's (1964) philosophical writings of bureaucracy and technology, and to a lesser extent Foucault's (1973, 1995) archaeological and genealogical methods, also informed second wave urban studies.

An exemplar second wave historical urban study includes McShane's (1979) study of street pavements represents. The study linked changes in street pavements directly with social and cultural changes. Further, by drawing on Ellul's (1964) philosophical work, Schultz and McShane (1978) traced how changes in scientific knowledge around illness resulted in changes to city administration. As such, tracing the contours of materiality resulted in the scholars reveals how engineers increasingly began to play a larger role in transport planning. Davison's (1981) *The rise and fall of marvellous Melbourne* provides an Australian exemplar of second wave urban studies concerned with history.

To summarise, second wave urban studies broke with positivism. Deficiencies in a positivistic ontology to explain action and decisions resulted in second wave urban

studies adopting counter theories of agency. Yet, scholars still found such accounts limited, and thus the dominance of modernism finally became untenable. In aligning with a constructivist ontology, post-structuralist and post-modernist theories introduced a world in a constant state of revision (Bryman, 2008). Social and cultural theorists have long sought to conceptualise the concepts of agency and structure recursively (Messner, Clegg, & Kornberger, 2008). Yet, the post-modernist break the spurned third wave urban studies—and which remains prevalent in contemporary research—resulted in making sense of the “swirling maelstrom” of contemporary urban life (Dear, 2000, p. 5). To understand how this swirling maelstrom view of the world altered theorisation of transport planning, we turn to examine the third and final intellectual wave of urban studies.

Ideas, arguments and theories that spurned the shift from second to third wave urban studies remain core to work conducted in contemporary academic research. For example, Giddens's (1979, p. 255) concept of the ‘duality of structure’ recognised “the reflexive monitoring of action both draws upon and reconstitutes” how urban societies are arranged. Similarly, Bourdieu's (1977, p. 76) concept of ‘habitus’ sought to capture how the habitus reproduced objective structures of which they were also the product. Recent urban studies have gained from integrating these ideas. For example, building from Giddens' structuration theory, Vigar (2002) demonstrated how transport planners are both confined and assisted by their respective policy communities. Similarly, Binder and Boldero (2012) employed the habitus concept to reveal how innovation in housing involved overcoming the constraints of one's professional habitus.

Third wave urban studies concerned with practice continued to document how professionals make change in planning outcomes. Titles to exemplar third wave urban studies underscore the emphasis placed on the actor such as Forster's (1989) *Planning in the face of power*, Hoch's (1994) *What planners do: Power, politics and persuasion* and Grant's (1994) *The drama of democracy: Contention and dispute in community planning*. Bringing actors to the fore in analysis has created conceptual room that helps scholars position their analysis in a way that convincingly demonstrates how professionals actively participate in and reconcile planning issues. Though constrained by governance, studies demonstrate the ‘how’ of planning. Yet, similar to the second wave, urban studies concerned with practice continue to neglect including materiality in analysis.

Third wave urban studies have also begun to draw heavily from discourse analysis. Whereas urban studies concerned with practice drew heavily from Habermas' (1984, 1987) work with critical theory, urban studies concerned with governance drew more from Michael Foucault and Martin Hajer's (1997) re-interpretation of Foucault's theoretical work on discourse analysis. Though caution is highlighted when making asserting and concrete conclusions, evidence contained in differing urban studies, based on which discourse analytical strand is drawn from, do appear to provide some insight for divergent theorisation of how action and decisions are advanced or constrained.

Urban studies drawing more heavily from Habermas for example, often conceptualise professional practice as collaborative. Scholars theorise a middle ground between individual and structural accounts of the world (Forester, 1993, 1999; Friedmann, 1987; Healey, 1997). "To (over)simplify a complex argument"... critical theorists concluded knowledge is "neither transcendental, empirical, nor individual, but essentially a social construct" (Alexander, 2000, p. 246). In defining communication as a constitutive property of planning, collaborative planning was perceived as carrying the latent potential to foster emancipatory, socially inclusive, and democratic-oriented outcomes (Forester, 1999; Healey, 1997).

In contrast, urban studies drawing more heavily from Foucault, cite various problems with a collaborative account of practice; most notably being a naivety towards issues of power (Flyvbjerg, 1998; Huxley & Yiftachel, 2000). Although communicative accounts of planning acknowledge power, the primary aim is to analyse how consensus can help resolve a planning problem. Fischler (2000a, p. 362, *italics original*) suggests this conflates defining "communication *in* planning" with "planning as communication". Empirical evidence appears to support Fischler's concerns that even the best intended policy, is structured by uneven power relationships. Scholars have continued to document how power corrupts both urban planning (Flyvbjerg, 1998) and transport planning (Langmyhr, 2000; Richardson, 2001).

Exemplars of third wave urban studies concerned with governance include Hajer's (1997) *The politics of environmental discourse* and Flyvbjerg's (1998) *Rationality and power*. The terms politics and power in both titles reflect a deep connection to theories of power and structure advanced by Foucault. Hajer's work remains foundational to a growing body of urban studies (Peters, 2003). For example, Vigar (2002) and Curtis and Low (2012) both applied Hajer's discursive analytical methods to examine

transport planning. Building on Wagner's (1990) concept of "discourse coalitions", Hajer conceptualised discourse coalitions as fragmented, competing and institutionally arranged. Hajer (1997, pp. 58-59) then further positioned himself against other discursive analytical theories in two important ways. First, language was not conceptualised as a passive tool but an enabling construct essential for daily life. Second, actions and perceptions were separated from belief systems in order to suggest "discursive interaction" created opportunities for actors to reposition themselves through new meanings or identities.

Third wave urban studies concerned with governance have more recently begun to align under the label of 'new institutional studies' (Hall & Taylor, 1996; Jessop, 2001). The label marks a divergence from prior waves. Studies integrate concepts, theories and methods from a range of disciplines, such as organisational studies, political science, history and sociology. Studies applying a new institutional lens have examined urban and transport planning in Australia (Curtis & Low, 2012; March, 2007), the UK (Healey, 1997; Vigar, 2002), and more broadly North America and Europe (Rietveld & Stough, 2005). Hall and Taylor (1996) identified three streams of institutional analysis: historical, rational and sociological. All three streams continue to dismiss accounting for infrastructure in analysis (Richardson & Jensen, 2003). Importantly, change is viewed as static, occurring through shocks or critical junctions which result in path dependence or altering cultural norms and rules.

The decades following Kuhn's notion of scientific paradigms resulted in history and sociology disciplines extensively debating issues of methodology and epistemology (Abbott, 1988; McDonald, 1996; Skocpol, 1984). As such, third wave historical urban studies reflect a destabilisation brought upon by studies embracing and critiquing the merits of path dependency (Howlett & Rayner, 2006; Mahoney, 2000), temporality (Griffin, 1992; Pierson, 2004) and problem framing (Haydu, 1998). For example, an exemplar of third wave historical urban studies include Winter's (1993) *London's teeming streets* and Brown-May's (1998) *Melbourne street life*. Such studies empirically demonstrated how urbanised road space has historically been the primary site for a range of public activities, least of which was motorised movement. Focusing attention on how technology intersected with society drew attention to tumultuous public battles over increased regulation of urban street life.

To summarise, third wave urban studies concerned with professional practice situate actors in their respective institutional settings, but assume professionals have agency

(Forester, 1989; Grant, 1994; Hoch, 1994). For example, Forester has reminded planning scholars every decade that planning by its very nature is argumentative (Forester, 1989), to stop rediscovering power corrupts (Forester, 1999) and instead to ask the question: So what? – If planning is political how do planners manoeuvre through politics? (Forester, 2011). Forester's plea rests on two key assumptions: planners have agency to manoeuvre and analytical methods can draw out how manoeuvring is accomplished. Third wave urban studies concerned with governance assume the institution to be foundational for analysis. Actors are conceptualised as “units of analysis” that cannot be theorised as the consequences of individual attributes or motives (DiMaggio & Powell, 1991, pp. 8-9). In contrast, third wave historical urban studies have documented how the actions and decisions of knowledgeable actors are influenced by a range of inanimate materials, objects and technologies (Ehrenfeucht & Loukaitou-Sideris, 2007; Mcshane, 1999; Norton, 2008).

Therefore, in way of summary, interrogating exemplars of work framed by three waves of intellectual debate in urban studies has revealed several important findings. Table 2.2 summarises different theories of transport planning in relation to the elements identified in the sociology of scientific knowledge presented in Table 2.1.

Table 2.2: Summarising core theories used in three waves of urban studies in relation to elements contained in the sociology of scientific knowledge

Wave	Scientist	Scientific culture	Materiality
First wave (Positivism)	Actors behave, think and act rationally	Actors employ step-wise logical decision-making processes. 'The State' holds power and plays central role in shaping an actor's decisions and actions	If included, materiality viewed as technologically deterministic
Second Wave (break with positivism)	Actors have agency in the sense they make personal choices and normative decisions	Structure internalised by autonomous actors through socialisations. Thus, actors balance rational processes with normative concerns which results in incremental change	Infrastructure the product of chances within society, culture and urban planning professions
Third Wave (post-modern/post-structural)	Agency and structure are viewed as a dynamic relationship which emerges through practice. Thus, actors constrained by governance still actively participate in change	Institutional setting foundational, making individual actions and decisions as separate units of analysis impossible	Tracing how technology and infrastructure introduced in urban society emphasises how materiality shapes and is shaped by, changes within society, culture and professions

Urban studies concerned with practice situate actors in their respective institutional settings, but assume actors have agency. This theorises actors bringing about change; an important consideration for destabilising the dominant car paradigm. In contrast, urban studies concerned with governance assume the institution is foundational in analysis. Agency is theorised relation to laws, conventions, politics and governance. It would be naïve to think that professionals are not constrained by professional rules of conduct, organisational conventions or policy frameworks set at the political level. Yet practice-oriented studies strongly suggest that though constrained by governance, actors have, can and do bring about change. Further, historical urban studies provide the only urban study stream to incorporate materiality in analysis. Insight from this body of research has enormous implications for theorising road space allocation. Not least of which is materiality is neglected in other urban study streams of research. Leaving aside questions for moment related to theorising agency, particularly with respect to materiality, we continue to examine urban studies. This time, the objective is to illuminate specific elements to analyse road space allocation.

2.1.2 Identifying conceptual elements within urban studies

Examining the urban studies literature reveals discrepancies in how practitioners are discussed and defined. For example, Altshuler's (1974) discussion identified practitioners by disciplinary background, but failed to expand more critically on how different disciplines might shape transport planning. Similarly, Innes and Grubber's (2005; 2001) discussion included statements such as MTC staff were found to hold a variety of specialised discipline backgrounds, from engineering to economics and planning (Innes & Gruber, 2001, p. 379). In comparison, Vigar (2002, p. 204) found that the bulk of the UK civil service involved in transport planning was comprised largely of economic and traffic engineering disciplines. In exploring the implications of this finding, Vigar (2002, Chapter 9) oscillates between discussing how traffic engineers (p. 204), town planners (p. 207) and transport planners (p. 208) each have a role in implementing more sustainable transport policy. Curtis and Low (2012, Chapter 12) similarly oscillate between discussing the urban planning profession (p. 211), planners (p. 212) and transport planners (p. 212). In contrast, historical urban studies call into direct question the all-knowing planning surveyor or traffic engineer (Bonham, 2002; Brown, 2006; Clapton, 2005; Norton, 2008).

Conflating disciplines in transport planning fails to account for how disciplines constrain or provide liberties in allocating road space. In Chapter 1, transport planning/planner

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was defined as professionals responsible for allocating road space within metropolitan Melbourne. This definition makes sense given the unique topic of road space allocation. Yet, even this definition masks different disciplines held by professionals responsible for allocating road space. We saw in the first half of this chapter that scientist broadly represents actors involved in scientific studies. This label makes sense given specialised areas of scientific study. However, the encompassing ambit of transport planning involves a wide range of more specialised disciplines, such as urban design, engineering and urban planning. Consequently, though transport planner is defined in this thesis in relation to road space allocation, interrogation of urban studies clearly indicates a need to clarify, if not explicitly account for in analysis, how and to what if any extent different disciplines impact road space allocation.

Examining the urban studies literature reveals discrepancies in the conventions and routines of professional practice. For example Meyerson and Banfield's (1964) study was seminal to both testing, advancing and advocating the rational comprehensive model during the first wave of urban studies. Although since updated from the study, the model continues to broadly outline a decision-making construct that theoretically posited a logical and linear five-step process beginning with: (1) identifying problems and criteria, (2) identifying potential solutions and courses of action, (3) predicting consequences of actions, (4) evaluating consequences of actions, (5) selecting appropriate actions based on criteria (Khisty & Arslan, 2005, p. 78, summarising Rosenhead 1989). The rational comprehensive model assumed that whatever the goals of society were at the time, they would more likely be achieved if problems were analysed rationally. Supporting the model were four fundamental assumptions: (1) planning occurs linearly, (2) planning is informed by appropriate and adequately defined problems, (3) problems are supported by rigorously collected un-biased data, (4) information feeds through an unbiased decision-making process to implementation. Similarly, travel almost singularly remains premised on two core economic principles: 1. travel is a derived demand and therefore is not conducted for pleasure, and 2. as a derived demand, travel is perceived as a negative utility which actors seek to minimise any and all costs associated with travel (Banister, 1994, 2008). Travel, therefore, is understood as logical autonomous actors, making rational decisions, and influenced by the needs, actions or desires of friends or family (Buliung & Kanaroglou, 2007). However, scholars continue to question the validity of the rational comprehensive model or economic accounts of travel (Banister, 1994; Friedmann & Hudson, 1974; Khisty & Arslan, 2005). Yet, the legacies of both have led scholars to concede that

regardless of deficiencies their dominance guides contemporary practice (Timms, 2008; Willson, 2001). Thus, in seeking to develop a picture of the science of transport planning, particularly in relation to examining norms, conventions and professional conduct, it is critical to differentiate between limitations of frameworks used in transport planning, from limitations of transport planning.

Another example of why making this differentiation is important can be seen in Innes and Grubber's (2005; 2001) comprehensive five-year study of transportation planning in the San Francisco Bay area. The investigation identified four planning styles that guided the actions and decisions of a diverse range of professionals. The study's aim was to test the strength of collaborative processes. Consequently, the analysis started from the position that the collaborative style is the ideal style. Although incorporating communicative processes into transport planning is a worthwhile pursuit, it discounts analysing transport planning in its current form. Thus, determining whether transport planners do or do not apply communicative processes can be equally or perhaps more relevant, than advancing a normative position that they should.

In seeking to develop a picture of the norms, conventions and professional conduct that shape road space allocation, it is therefore clear that a need remains to differentiate between limitations of frameworks used to allocate road space, from limitations of transport planning. However, making this differentiation does little in the way of actually defining conventions and routines pertinent to road space allocation. We saw in the first half of this chapter that scientific culture broadly represents the structural components that guide and shape the actions and decisions of scientists. Therefore, to understand more specifically the culture that guides road space allocation, we turn to urban studies concerned with governance.

Examining urban studies concerned with governance revealed a growing reliance to understand examine action through discourse. For example, Vigar (2002) and Curtis and Low (2012) both applied Hajer's discursive analytical methods to examine transport planning. Curtis and Low (2012, p. 34) analytically separate "organisational structure" from "routines, norms and conventions". Organisational structure is defined as formalised rules that determine and establish skills required to conduct transport planning, and determine governing responsibilities for different aspects of transport planning. Conventions are defined as "the talk that goes on around policy", which can be written and verbalised. In contrast, Vigar (2002, pp. 29-38) distinguished between policy arenas, which consist of different organisations, from policy communities, which

consist of organisational culture and informal routines. The difference between the two studies reflect Hall and Taylor's (1996) separate streams of institutional analysis. Curtis and Low's historical perspective and emphasis on path dependency requires the examination of governance. Thus, how governing authorities develop and change overtime reveals different aspects of power, which in turn highlights how imbalances of power shape and maintain path dependent policy trajectories (Curtis & Low, 2012, pp. 33-36). Vigar's sociological perspective emphasises a relational view of the world, where power does not reside in a specific government authority. Thus, examining policy arenas provides an analytical lens to focus on professional practices and activities in the context of a wider "social milieu" that is not simply premised on "bureaucratic machinery of governance" (Vigar, 2002, p. 22).

Hall and Taylor (1996) suggest a key strength of the institutional approach is its explanatory power about why institutions persist. This requires focusing on macro-level processes. The discursive analytical lens applied by Curtis and Low (2012) and Vigar (2002) examine such macro-level processes. Though the explanatory power of discourse to explain action is acknowledged, actors are shifted to the back of analysis. An actor's actions and decisions are explained through discursive concepts such as a storyline. Practice-oriented studies highlight the strength in bringing actors to the fore in analysis. Yet, discursive accounts of transport planning do provide insight into how one might go about defining conventions and norms that guide transport planning.

Finally, examining the urban studies literature reveals limitations in incorporating materiality into analysis. The research agenda outlined by Pinch and Bijker (1984) has been crucial to developing stronger links between technology studies and science studies (Pickering, 1995), and to historical urban studies discovering an 'interpretive flexibility' of artefacts (Norton, 2008). Urban studies concerned with history clearly highlight that strength in tracing the contours of materiality. For example, problematising time reveals how the standardisation of time resulted in transport timetables and constructing new social norms around travel. Notions of running late, being early or arriving on time were normalised through the standardisation of time (Bonham, 2002; Davison, 1993; Thrift, 1996, chapter 7; Urry, 2008, chapter 5). See Thrift (1996, chapter 5) for a compelling counter argument to time beginning with the invention of the face-clock. In terms of the construction of travel, "*time* underpinned the economical journey as it was each individual's *time* that was spent and saved in the journey between two locations" (Bonham, 2002, p. 80, italics in original). In bridging notions of space and time into something measured, time subsequently transformed

into a resource, “differentiated off from social space, consumed, deployed and exhausted” (Urry, 2008, p. 98). Local government by-laws further normalised changes in time, which eventually became accepted as professional norms and conventions (Brown-May, 1998; Ehrenfeucht & Loukaitou-Sideris, 2007). Thus, technology associated with time in turn helped shape and inform how travel patterns slowly came to be regulated, organised and normalised. Clapton’s (2005) unpublished thesis provides a Melbourne-specific example of how materiality can be included into analysis. Clapton examined the rise of traffic regulations in Melbourne from the perspectives of the car. Thus, the car provided a lens to examine how nascent transport planning knowledge was created, refined and constrained. Although such studies provide support for examining how the material contours of agency emerge through the everyday practices of professional transport planning, solutions and problems empirically identified remain contingent to their context (Somers, 1996). Consequently, material agency remains bound within methodological considerations. As we see in Chapter 3, this has important implications for how materiality is included in analysing road space allocation.

2.2 The constitutive elements of road space allocation

Interrogating the urban studies literature has revealed several findings. Practitioners are discussed and defined in contradictory ways. There is a need to differentiate between limitations of processes from limitations of practice and there is a growing reliance on discourse analysis to explain action. Further, materiality remains largely absent in analysis. Despite these concerns, transport planner, governance, organisational conventions and infrastructure are found to reflect the constitutive elements that comprise road space allocation. Table 2.3 identifies literature providing detailed accounts of how these elements have been applied.

Table 2.3: Comparison of elements

Element(s)	Transport planner	Governance Organisational conventions	Infrastructure
Literature	Checkoway (ed) (1986) Forester (1989, 1999) Grant (1994) Hoch (1994) Innes & Gruber (2005)	Curtis & Low (2012) Healey (1997) March (2007) Richardson & Jenson (2003) Rietveld & Stough (ed) (2005) Vigar (2002)	Brown-May (1998) Clapton (2005) Ehrenfeucht & Loukaitou-Sideris (2007) McShane (1994) Norton (2008)

In this research, transport planning/planner is defined as professionals responsible for allocating road space within metropolitan Melbourne. This definition recognises that

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transport planners are trained at university in different disciplines (e.g. traffic engineering, urban planning and urban design). We shall see later that delineating transport planners in relation to road space allocation is insufficient for a more critical understanding of how different disciplines shape road space allocation.

As defined in this research, governance sets the broad parameters for who can and who cannot allocate what type of road space. Legislative acts help establish parameters for which authority is responsible for what portion of road space. Organisational conventions are defined as the formal professional conventions that guide road space allocation. Organisational conventions include professional techniques and methods.

As defined in this research, infrastructure includes technology (e.g. traffic lights) and artefacts (e.g. car). The material agency of road space is accounted for in analysis as a specific road space allocation tension (detailed below). We saw that theories of materiality in sociology of scientific knowledge was crudely generalised as falling along a spectrum. This thesis aligns itself in the middle of the spectrum (Pickering, 1995, see pp. 9-20 for detailed summary). The contours of material agency are therefore never known in advance, but emerge in daily work (Pickering, 1995, p. 14). This theory of materiality accords with theories found in urban studies (Lewis, 1979; Loukaitou-Sideris, 1996; Meinig & Jackson, 1979; Trancik, 1986).

Table 2.4 summarises the elements identified in Table 2.3 by intellectual wave in relation to the elements identified in sociology of scientific knowledge. The table draws attention to how elements are dependent on specific urban study streams. These streams can be categorised under the headings practitioner, institutional and historical. The categories draw attention to where agency is determined (* reflects locus of agency). The implications of Table 2.4 in developing a conceptual framework to analyse road space allocation are discussed later in the chapter. We can see in the first column that governance and organisational conventions are largely understood in relation to practitioner (i.e. transport planner). Instead of examining impediments to practice, focus centres on understanding how actors overcome constraints. In the second column transport planner is understood in relation to the institution (i.e. governance and organisational conventions). Focus remains on identifying how actors are constrained. As both streams perceive professionals as autonomous actors, different accounts of agency lie with stream, not element. In contrast, historical urban studies are principally guided by methodology. Thus, practice and governance are

contextualised within their historical settings. This point is illustrated in the third column with no element having primacy over another. This interpretation of agency opens the door to incorporate materiality—something the other two streams have yet to embrace.

Table 2.4: Summarising conceptual elements by intellectual wave in relation to elements contained in the sociology of scientific knowledge

Wave	Sociology of scientific knowledge		
	Scientist	Scientific culture	Materiality
	Urban study streams of academic focus		
	Practitioner	Institutional	Historical
First wave (Positivism)	Transport planner Governance Organisational conventions*	Transport planner Governance* Organisational conventions	Infrastructure*
Second Wave (break with positivism)	Transport planner* Governance Organisational conventions	Transport planner Governance* Organisational conventions*	Transport planner* Governance* Organisational conventions* Infrastructure*
Third Wave (post-modern/post-structural)	Transport planner* Governance Organisational conventions	Transport planner Governance* Organisational conventions*	Transport planner* Governance* Organisational conventions* Infrastructure*

Yet, questions still remain as how to conceptually and analytically understand road space allocation. Though the four conceptual elements of transport planner, governance, organisational conventions and infrastructure are identified, a need remains as to understanding why the elements intersect. This involves interrogating urban studies literature examined in the first half of this chapter. Additionally, it also requires interrogating literature more specific to the field of urban design.

2.3 Road space allocation tensions

Historical urban studies provide convincing evidence that resolution to mobility challenges are never solved, but resolved over and over again. As such, transport planners can be viewed as resolving different ongoing tensions. Though not absolute, tensions complicating road space allocation can be broadly categorised by four categories: liveability, spatiality, capacity and network. Each tension highlights different aspects of road space allocation. In summary: how space is allocated (capacity); why we allocate road space (liveability); what is being allocated (spatial); and the location of road space or the where (network).

2.3.1 Liveability tension

The liveability tension relates to the multiple ways that urban space can be understood, engaged with and reacted to or against, or the 'why' of road space allocation. Road space provides a route of communication (e.g. motorised and non-motorised travel, a link between multiple place-spaces) and also a site of transaction (e.g. non mobile access, commercial interactions and transactions, embodied place-spaces) (Roberts, et al., 1999). Yet, prior to a more formalised transport planning profession (identified in the capacity tension), such concepts and theories were still in their infancy during the late 19th century (Hall, 1995; Hass-Klau, 1990) and early 20th century (Brown, 2005, 2006; Hart, 1976; Norton, 2008).

Early professional publications such as *The American City* and the *Municipal Journal and Engineer* provided an essential arena to record new knowledge and an invaluable resource to collect and categorise facts, concepts and knowledge for emergent professions in North America (Brown, 2006; Norton, 2008) and Australia (Freestone, 2004; Freestone & Grubb, 1998). Such publications helped drive a "vigorous two-way transatlantic traffic" of ideas between British and American planners from 1900 to late 1930 (Hall, 1988, pp. 164-165). Briefly examining a 1916 volume entitled *City Planning* provides a snapshot of how the liveability tension was discussed and reconciled by professionals during this early period in the transport planning profession.

The 1916 volume is noteworthy for three reasons: a) its discussion on a road's potential hierarchical and functional properties (Olmsted, 1916); b) the relation of such functional properties to allocating road space (Bouton, 1916); and c) acceptance of such knowledge within a small yet international community (Haldeman, 1916). Consensus around each of these points was slow, but each was critical to resolving the liveability tension. A passage from Frederick Law Olmsted Jr. (the son of Senior Frederick Law Olmsted) underscores the first point.

There has been a decided tendency on the part of official street planners to insist with quite needless and undesirable rigidity, upon certain fixed standards of width and arrangement in regard to purely local streets, leading inevitably in many cases to the formation of blocks and lots of a size and shape ill adapted to the local uses to which they need to be put (Olmsted, 1916).

Southworth and Ben-Joseph (1997, p. 1) employed Olmsted's passage to introduce their historical analysis on street standards; stating the passage was even more relevant given contemporary planning issues with suburban development. Although

this research concurs with Southworth and Ben-Joseph's overall findings, the use of Olmsted's passage is found to be slightly misleading. In the volume where Olmsted's passage originated from, Olmsted (1916, p. 9) explicitly discussed the importance of conceptualising *city traffic circulation* as occurring within a single connected system as dictated by its *functional properties*. Olmsted's discussion goes to the heart of the liveability tension. Though Olmsted (1916) was highly critical of technologically oriented accounts of a city's socially-complex evolutionary process, Olmsted still resolved the liveability tension by applying specific road classifications.

Bouton's (1916) chapter entitled 'Local and minor streets', further supported the veracity to plan, arrange and allocate road space by road classifications. In his footnotes Bouton (1916, p. 88) clarified his use and definition of the term "local street" by differentiating two simple categories of major and minor streets. According to Bouton, altering a local street's intended use into "more than a purely local use" would require considerable modification by planners. Bouton's dualistic classification were more famously outlined in Charles Robinson's (1916) *City planning*. Brown (2006, p. 6) has noted in his historical review into efforts by traffic engineers to build a 'science of transportation planning' that Robinson (1916, pp. 87-88) defined a minor street as one that provided "residents refuge from tidal traffic streams" and then classified all subsequent streets as roads that invite traffic.

Consensus on how to resolve the liveability tension continued to develop. For example, a special 1916 edition of the *Municipal Journal* entitled "Practical Street Construction" can best be summarised as a theme running through the entire volume: "although a street might be used for other purposes "traffic is what characterises" a street (*Municipal Journal*, 1916, p. 8). Though traffic came to characterise how the liveability tension eventually came to be resolved, questions remained as how to determine which roads receive what level of traffic. For example, in a 1922 volume of *American City*, Bartholomew's (1922) article "The Principles of City Planning" outlined six core issues of concern when developing a city plan, pertinent to this discussion being the street system. Bartholomew (1922, p. 457) stated there are "three types of streets that every well planned city should have: 1. Main arterial thoroughfares; 2. Secondary (cross-town) thoroughfares; and 3. Minor streets. Bartholomew's discussion further underscores how road classifications increasingly became critical to determining what level of traffic was acceptable for what road. Thus, reconciling the liveability tension came to be largely resolved through application of different road classifications (Harland Bartholomew and Associates, 1928; Kling, 2005; McClintock,

1925; Taylor, 1924). We see later in the network tension that several key publications refined road classifications through the conventional road classification hierarchy.

In briefly examining the rise of concepts found in historical professional publications, it becomes clear that a unified body of knowledge surrounding how to reconcile the liveability tension slowly solidified. Specifically, growing reliance on road classifications helped an early yet still largely uniformed transport planning profession tackle the very real need around how to reconcile competing demands over the right to use road space. The arrival of the car accentuated the problem, and in the case of the liveability tension, the importance of unfettered travel slowly came to dominate how the tension was resolved. Yet, contemporary transport planning clearly calls into question the simplified refinement of the liveability tension as one of tackling the topic of traffic.

2.3.2 Capacity tension

The capacity tension highlights the uncertain shift from the dominant car paradigm occurring in professional transport planning, or the 'how' of road space allocation. Making the normative determination to meet existing and future mobility pressures, or deciding to suppress and modify mobility systems and networks towards a different future, is a choice that every government must find their own position on (Brindle, 2001). Clearly, such normative decisions will involve a multitude of actors, ranging from the general public and business communities, to professionals and politicians.

Accounts of how the transport planning profession came into being are often based on a linear narrative of the profession in relation to the car. This linear account is problematic, particularly in light of contemporary practice, where questions remain to what extent the transport planning profession has adopted a demand management stance. To examine the capacity tension further, we briefly examine a linear account of transport planning.

Towards the end of the 1970s, several academics took stock of where their discipline was in relation to that of transport planning. Transport planning was discussed from the perspective of sociology in and of transport (Healey, 1977); from the perspectives of transport planning in Australia (Hensher, 1979) and North America (Perloff & Flaming, 1977); and from the perspective of transport geography (Rimmer, 1978). Although each focused on different aspects of transport planning, collectively the scholars provided a similar narrative of four phases that transport planning has traversed in respect to the car.

The first phase began just after the Second World War where increasing car ownership and use coupled with employment concerns created a perceived need for transport planners to provide car-specific infrastructure to meet a new and growing demand. Hensher (1979) described this as a period of operational development that occurred from 1955 to 1964, and in which the gravity model theory was developed and took shape. Social objectives of transportation were subsumed under a greater focus of “market-driven planning objectives” (Healey, 1977, p. 203). Traffic engineers were believed to hold neutral and technical advice regarding how to plan for the car. It was during this first phase where the five-step rational planning model was conceived and developed. Both the assumptions and justifications supporting this model have been criticised from different perspectives (Faludi, 1976; Forester, 1989).

The second phase began during the late 1950s and ended during the mid-1970s. Most westernised countries underwent a massive freeway construction boom that large metropolitan transport studies had determined were critical to future travel demand. Seminal studies such as the Chicago Area Transportation Study (CATS) that originated in North America quickly spread to other countries including Australia (Banister, 1994; Black, 1990; Mees, 2000). CATS codified Urban Transportation Modelling Systems (UTMS) techniques and provided professionals with a real-life example of the “classic four-step transport planning model” based on the five-step rational planning model (Banister, 1994; Black, 1990). The four-step model has been extensively critiqued (Banister, 1994; Hensher, 1979; Mees, 2000). CATS adopted theories developed by Robert Mitchell and Chester Rapkin and outlined in their seminal text *Urban traffic: A function of land use* (1954). As the book title suggested, their theory postulated that future mobility infrastructure needs could be determined by examining the functional relationship of travel to land use. CATS and Mitchell and Rapkin’s theory combined to provide transport planners a singular example of trend planning, or what is referred to as the classic ‘predict-and-provide ideology’. Trend planning forecasts future demand (predict), and synthesises and evaluates such predications against larger comprehensive goals, based on ensuring future capacity (provide) (Banister, 1994). Providing more and more infrastructure capacity to ameliorate the pressure of uncontrolled demand was recognised very early by scholars as not only a bad idea, but would likely reproduce “the same problem on a larger scale” (Thomson, 1969, p. 9).

The massive freeway construction boom lead to the third phase that challenged core assumptions developed in earlier phases. Community groups held protests and questioned the science of transport planning. Yet, modifications to the science of

transport planning failed to fundamentally alter existing practices (Healey, 1977, p. 206). Although scholars clearly recognised transport planning had to change, conventions and practices continued largely unchecked.

In discussing the fourth phase and the future of transport planning, each scholar remained cautiously optimistic. The planner was not conceived “as a super-being but, like the *planned*, subject to control” (Healey, 1977, p. 198). As new institutional arrangements from those in place at the time were required for transport planning to change, Hensher (1979, p. 98) presciently notes that the fourth phase had just begun and would almost certainly “dominate the rest of this century”.

Each scholar has continued to publish around the topic of transport planning, and in many instances their viewpoints both academically and personally have changed. However, urban studies published post 1979 continues to document evidence that questions a linear narrative of the transport planning profession; the “new realism” literature exemplifies this point (Goodwin, Hallett, Kenny, & Stokes, 1991).

New realism captured an ideological shift that scholars identified within the UK transport sector during the late 1980's. The shift reflected a perceived transition from predict-and-provide to a demand management stance challenges (Vigar, 2002); evidence from urban studies question if new realism ever reflected a new transport planning phase (Docherty & Shaw, 2011; Healey, 1997; Vigar, 2002).

2.3.3 Network tension

The network tension draws attention to conflicting local and metropolitan road space needs, or the ‘where’ of road space allocation. At a metropolitan scale, transport planners are increasingly wrestling with how to do more with less space. At a local level, how space is allocated determines how society engages with road space. We have seen resolution of the liveability tension involves application of different road classifications. Deeply interwoven with road classifications is the hierarchy typology.

The hierarchy typology is not a traditional term found in transport planning, but is instead understood under the term ‘conventional road classification hierarchy’ (Goodwin, 1995; Hass-Klau, 1990; Marshall, 2005; Plowden, 1972). In summary, the conventional road classification hierarchy consists of a set of roads, which are classified by their functional characteristics and hierarchically arranged based on a set of normative considerations, such as safety, speed and use. Yet, in the context of road space allocation, the hierarchy typology provides a schema to help transport planners

construct strategic processes and decision-making frameworks to resolve the network tension. Though cumbersome, the term hierarchy typology reveals how transport planners bring closure to reconcile the spatial tension, and in so doing, resolve the network tension. Hierarchy, defined as an arrangement or classification of things according to relative importance or inclusiveness (Oxford Dictionary, 1993a), and typology, defined as a classification according to general type (Oxford Dictionary, 1993b), together provide an important blueprint to merge road classifications (i.e. typology) into the conventional road classification hierarchy (i.e. hierarchy).

The development of the conventional road classification hierarchy has a very long history. Briefly discussing work and ideas developed by the Metropolitan Town Planning Commission, Alker Trip and Robert Buchanan clarify two points regarding the network tension. The first relates to continued refinement and reliance on road classifications and eventual application of the conventional road classification hierarchy to resolve both the spatial and network tensions. The second centres on how this occurs, which is through what is referred to in this thesis as a hierarchy typology.

The *1922 Metropolitan Town Planning Commission Act* by the Victorian parliament created the Metropolitan Town Planning Commission (MTPC). The Commission was given advisory status based on the North American tradition of developing a comprehensive metropolitan plan via a city planning commission (Freestone & Grubb, 1998). Its focus on “efficiency” and “prudent use of space and time” stemmed from cross-pollination of North American planning ideas and overseas visits (McLoughlin, 1992, p. 33). The influence can be seen in MTPC relying on Bartholomew (MTPC, 1929, p. 51) and McClintock (MTPC, 1929, p. 56) to support their work. For example, in the *Roads Improvement Recommendation* subsection under the title “A system of thoroughfares for Melbourne”, the MTPC arranged roads based on different functional criteria. By distinguishing and differentiating secondary roads from arterial routes, the MTPC developed a road hierarchy based on four road types (MTPC, 1929, pp. 91-92):

- Tramline streets: auxiliaries to arterial road system
- Outer suburban connexions: intercept main routes to lead traffic to arterial routes
- Intersuburban and ring roads: bridge suburban connexion roads with arterial roads
- Parkways: avenues for the lighter types of traffic and to form parkway drives

The MTPC’s 1929 *Plan* outlined one of the earliest international examples of a *metropolitan-wide road system based on a hierarchy typology*. The decision to classify road space hierarchically reflects a natural progression from knowledge contained in

international publications (identified in the liveability tension). However, the MTPC had a muddled and conflicting relationship with the existing state authorities of the CRB and the MMBW (Davison & Yelland, 2004). With 12 separate ministry changes occurring during MTPC's report preparation between 1922 and 1929, Victoria's political landscape further hampered the implementation of the 1929 *Plan* (Sandercock, 1990). Absent legal teeth and little support from municipalities, the work become overshadowed by the Great Depression (Freestone & Grubb, 1998). Ideas later developed by Alker Tripp and Robert Buchanan provided transport planners further support for formalising a set of functional road classifications (Goodwin, 1995; Hass-Klau, 1990; Marshall, 2005; Plowden, 1972).

In 1938, Tripp's (1950) *Road traffic and its control* filled an important gap in knowledge concerned with arranging existing road space. Scholars often Tripp with developing the formative 'conventional road classification hierarchy' (Goodwin, 1995; Hass-Klau, 1990; Marshall, 2005; Plowden, 1972). Tripp sought to alleviate safety concerns he attributed to cars intermingling with pedestrians by increasing circulation on certain roads and reducing it on others. This viewed road space as primarily the site of movement (i.e. communication).

Several assumptions underpin Tripp's typology (Goodwin, 1995). First, it is possible and practical to classify roads by an actual or intended use; second, a notional continuous relationship exists between roads and journey distance; and third, roads higher in the hierarchy suggest larger roads. Based on an inverse yet dependent relationship between communication and transaction functions, Tripp over-emphasises a road's communication function at the expense of transaction. Thus, travel is "optimised" as one progressed through hierarchical road types. Marshall (2005) has concluded conceptualising communication and transaction as an inverse dependent relationship will always generate "unrealistic" planning objectives. This in turn fails to articulate a different future. Since Tripp's typology can't articulate a different future, Marshall (2005, p. 67) concludes Tripp's typology is "dysfunctional."

Assumptions underpinning Trip's work are best understood graphically. For example, Russell's (1968) "idealised road system" premised travel between and within urban development increased from neighbourhood precincts to the urban metropolitan area. Figure 2.1 reflects Russell's (1968, p. 172) comparison of road conflicts against a hierarchy of urban development prototypes. Figure 2.2 depicts conflicts Russell (1968, p. 170) attributes to competing land-use and road space needs. Based on Marshall's

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critique, conflicts Russell identifies are better understood to stem from Tripp classifying communication and transaction as an inverse dependent relationship.

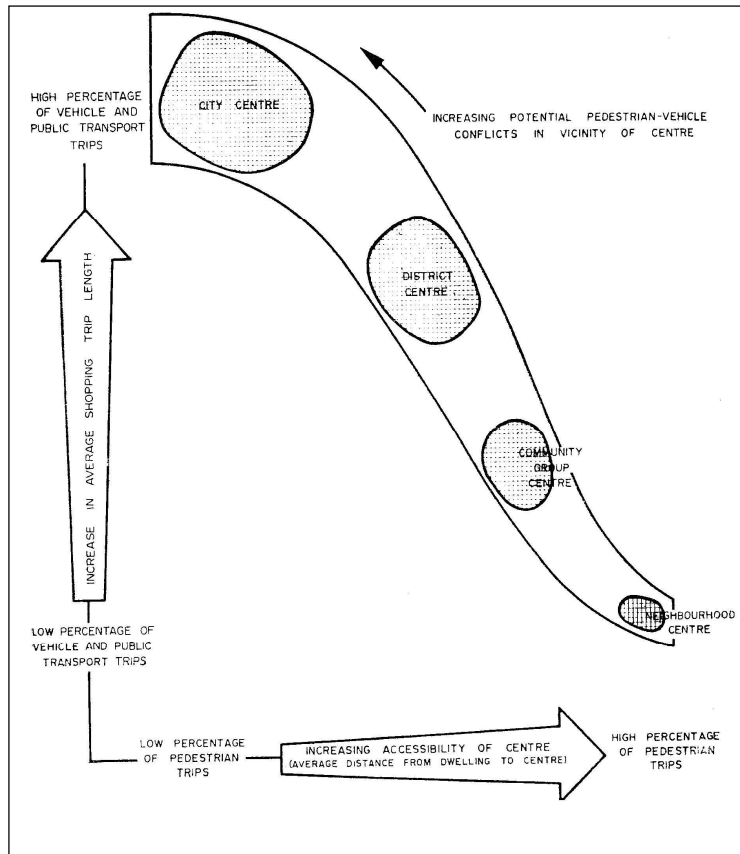


Figure 2.1: Russell's conflicting urban functions

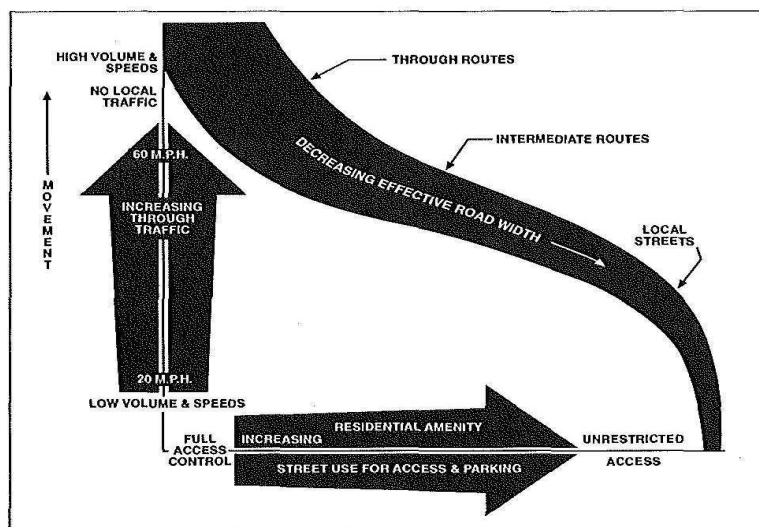


Figure 2.2 Russell's conflicting road functions

Chapter 1 described how road space can be allocated under a variety of concepts depending on country and circumstance. Concepts identified by Karndacharuk, Wilson and Dunn (2014) help professionals allocate road space. A brief examination of traffic calming provides insight to further understanding the network tension. Specifically, examining the close links between Tripp and Buchanan shed light on the continued reliance of the conventional road classification hierarchy to resolve the network tension specifically, and its wider application in transport planning more generally.

Buchanan's study *Traffic in towns* is often cited as seminal to traffic calming (Ben-Joseph, 1995; Hass-Klau, 1990). As both an engineer and architect, Buchanan brought a unique lens to the subject of transport planning. He was adamant about not following a strict traffic engineering mentality that placed traffic first and foremost (Marshall, 2005). Reminiscent of Olmstead Jr. (1916), Buchanan (MoT, 1964, p. 50) was sceptical that scientific methods could adequately capture circulation patterns generated from the complex relationship between vehicles and buildings. Buchanan's interdisciplinary team were tasked with understanding the wider repercussions of the UK's "long-term development of roads and traffic in urban areas and their influence on the urban environment" (MoT, 1964, p. 17). The team was not asked to produce specific proposals but to provide ideas for reducing traffic congestion and to reconcile conflicts between the urban form and the car (Ben-Joseph, 1995).

Although Buchanan (1964, p. 60) acknowledged Tripp's 'precinct' concept in developing his concept of environmental areas, he stated from the premise that roads must be informed by an overall transport route structure (Hass-Klau, 1990; Marshall, 2005). This proposition incorporated two core arguments: 1. increased road capacity often exacerbated instead of solved traffic congestion; and 2. traffic causes significant environmental "disbenefits" (Banister, 1994, p. 25). Scholars suggest that these arguments remain misunderstood by academic and professional transport planners (Banister, 2008; Hass-Klau, 1990; Marshall, 2005).

Buchanan's work has received both praise and criticism (Hart, 1976; Hebbert, 2005; Hillman, 1983; Marshall, 2005). For instance, Buchanan's "environmental area" and "movement network" principles provided the "definitive synthesis of urban design theory for the motor age" (Hebbert, 2005, pp. 43-44). The principles sought to divert traffic from "urban living rooms" onto "main traffic distributors". Although these principles provide a nuanced approach to road space allocation, they are premised on Tripp's work. Thus, Buchanan's work still neglects to preserve the traditional role of urban

streets as a “circulation artery and as an urban ‘place’ in its own right” (Marshall, 2005, p. 49). Marshall (2005) has summarised this outcome as the “rooms and corridors” analogy (p. 49). The analogy reflects two polarised road types: space between different environments for circulation, and space for work, play and living. Thus, “arteries” (i.e. corridors) handle larger traffic requirements, leaving residential, recreational and employment cells (i.e. rooms) with less through traffic.

A key assumption underpinning the three examples discussed (e.g. Metropolitan Town Planning Commission, Alker Trip and Robert Buchanan) relates to the notion of equilibrium. In the case of road space allocation, equilibrium can be defined as “a state of indecision or neutrality produced by opposing influences of equal force” (Oxford Dictionary, 1993a). Thus, assuming road space can reach a state of equilibrium requires accepting a bipolar premise: 1) sharing road space in some circumstances can generate safer outcomes with minimal effects to congestion and 2) segregated road space and modes reduces congestion and increases safety. The bipolar premise embedded in equilibrium generates a metropolitan lens that advocates risk minimisation and a local lens that advocates liveability. Whereas Tripp advanced road space allocation based on risk minimisation Buchanan looked to liveability. This difference perhaps suggests why Buchanan’s legacy remains debated. Although at a fundamental level Buchanan’s ideas were premised on liveability, Tripp’s influence ultimately meant that equilibrium was a hurdle Buchanan only partially overcame.

Although Tripp’s (1950, pp. 332-333) precincts appear to reflect contemporary traffic calming techniques, his design implies substantial road construction (Hass-Klau, 1990). Whereas Buchanan acknowledged the issue of “induced demand”, Tripp’s precinct implicitly advocated more road space (Hass-Klau, 1990, p. 150). Subsequent publications suggest Tripp never faltered from their basic propositions. In the preface to an updated *Road traffic and its control* published four years before Tripp’s death, Tripp again states: *Real planning will lead to ordered traffic*. The traffic can be largely controlled by the roads themselves, if those roads are properly designed, and if town and country are accurately planned (1950, p. v, emphasis on italics).

Tripp’s ideas eventually found their way into more administrative aspects of transport planning (this point is expanded on in later chapters). For example, although terminology and legislative mandate differ between country and authority, operationalisation of the typology is often differentiated between administrative and functional frameworks (Brindle, 1999; Marshall, 2005) as follows:

Chapter 2 Elements of road space allocation

Administrative: identify/classify administrative elements such as legislative and financial requirements and land title designation (private/public)

Functional (classic conventional hierarchy): identify/classify institutional elements such as the road planning requirements for design and operation concerning mode priority allocation, capacity increase or restraint techniques and strategies and planning scheme classification

Since administrative-type frameworks are premised on Tripp's typology they share similar assumptions (Marshall, 2005, p. 47): first, buildings frontages and public space remain towards a hierarchy's lower end; second, fast "motorised" modes remain towards the top and segregated from slow pedestrian "non-motorised" modes at the bottom; and third, a road's traffic designations based on hierarchical placement.

In summary, briefly discussing the work of Metropolitan Town Planning Commission, Alker Trip and Robert Buchanan sheds light onto two key points in relation to the network tension. The first point relates to continued refinement and reliance on road classifications and eventual expanded application of the conventional road classification hierarchy to resolve both the spatial and network tensions. The second centres on how this occurs, which is through what is referred to in this thesis as a hierarchy typology. The hierarchy typology provides transport planners with a blueprint to merge road classifications (i.e. typology) into the conventional road classification hierarchy (i.e. hierarchy). This in turn helps to resolve the network tension.

2.3.4 *Spatial tension*

The spatial tension highlights the obduracy of road space itself, or the 'what' of road space allocation. As has been emphasised, in the context of road space allocation, it is critical to understand how infrastructure (e.g. technology) shapes road space allocation. We saw in the first half of this chapter that answering this question involves engaging with theories of materiality. Yet, in addition to the three tensions (i.e. liveability, capacity and network), the materiality of road space itself, provides yet a fourth and final tension.

In the case of Melbourne, the spatial tension relates directly to Melbourne's road network. This includes aspects of the road network, such as its extensive tram network. Though largely constructed by the turn of the 20th century, the tram network continues to impact how transport planners allocate road space in Melbourne. Over the past decade, the Institute of Transport Studies at Monash University has generated a significant body of research aimed at optimising Melbourne's road network; particularly

in relation to Melbourne's tram network (Currie, Sarvi, & Young, 2004; Mesbah, Sarvi, & Currie, 2008; Mesbah, Sarvi, Currie, & Saffarzadeh, 2010). The Institute's use of the term road space allocation underscores technical solutions for affording Melbourne's on-road public transport system greater priority, not examining how elements intersect to shape road space allocation. The research conducted by the Institute does allude to a road's spatial tension, or the fact that there is only so much space and once a road is constructed the space is largely set.

Yet, whereas the trend for cities like Melbourne is to construct new tram systems, Melbourne does not have this problem. The problem facing Melbourne is that its already constructed tram network comes into conflict with other modes desiring priority; in particular the car. Thus, resolving such conflicts involves knowledgeable actors actively engaging with, and reacting to and against, a particular portion of road space. As we see in Chapter 5, resolution of the spatial tension is analysed through examining on-street car parking controversies. Similarly, in Chapter 6, resolution of the spatial tension is analysed through examining different tram priority trials.

2.2.5 Summarising road space allocation tensions

Table 2.5 summarises the four road space allocation tensions: liveability, spatiality, capacity and network. Each tension highlights different aspects of road space allocation.

Table 2.5: Summarising road space allocation tensions

Liveability	Spatiality	Capacity	Network
Reconciling the different functional characteristics of road space, most often classified as communication and transaction	Allocating road space inherently involves implicitly and explicitly dealing with road space	Reconciling whether road space allocation is based on predicting and providing or a demand management stance	Resolving the conflicting needs and requirements of road space at metropolitan and local levels
Roberts et al (1999) Hass-Klau (1990) Southworth & Ben-Joseph (1997) Brown (2005, 2006)	Ehrenfeucht & Loukaitou-Sideris (2007) McShane (1994) Norton (2008)	Vigar (2002) Evans et al (1999) Banister (2008)	Brown-May (1998) Hebbert (2005) Marshall (2005) Brindle (1999) Goodwin (1995) Hess (2009)

The liveability tension relates to the multiple ways that urban space can be understood, engaged with and reacted to or against, or the 'why' of road space allocation. Whereas under the dominant car paradigm road space is viewed principally a space for mobility, this view is increasingly being questioned. Consequently, resolving the liveability

tension is crucial to determining whether road space will be allocated based on communication, transaction or somewhere in the middle.

The capacity tension highlights the uncertain shift from the dominant car paradigm occurring in professional transport planning, or the 'how' of road space allocation. The transition requires new professional practices which are supported at the institutional level. Consequently, resolving the capacity tension is crucial if transport planners are to determine whether road space is perceived as limitless or constrained.

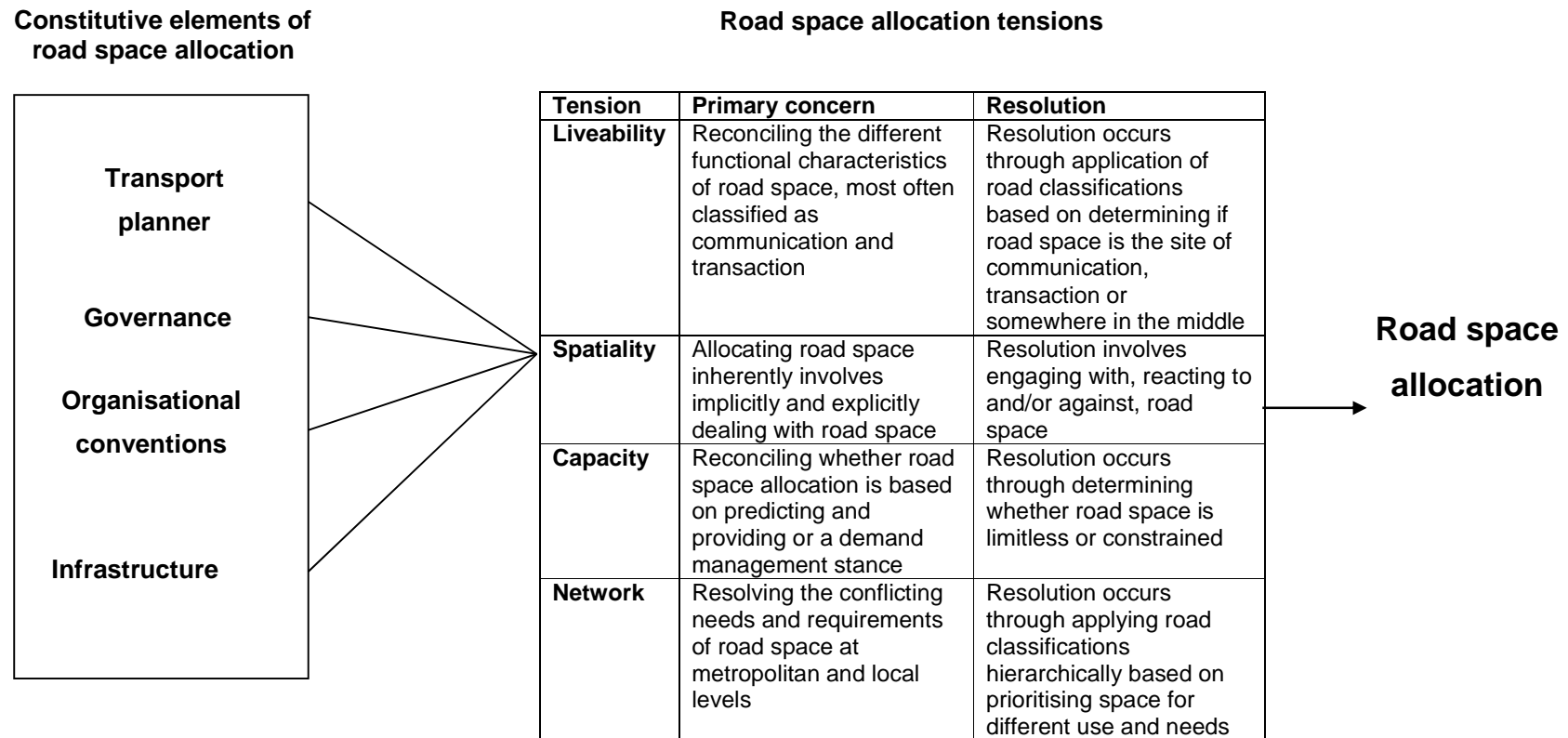
The network tension draws attention to conflicting needs and priorities of road space allocation at local and metropolitan levels. In the context of road space allocation, applying road classifications into decision-making frameworks through the hierarchy typology help resolve the network tension. Consequently, resolving the network tension is crucial if transport planners are to mitigate issues stemming from competing local and metropolitan road space needs.

The spatial tension highlights the obduracy of road space itself, or the 'what' of road space allocation. In the context of road space allocation it is critical to understand the ways in which a road's material contours of agency come to shape and determine the actions and decisions of transport engaging in the everyday professional practices. Consequently, determining whether road space is viewed as a theatre for humans, a mobility conduit, or a car parking lot, involves knowledgeable actors actively engaging with, reacting to and/or against, the road space in question being allocated.

2.4 A conceptual framework to examine road space allocation

By way of summarisation, Figure 2.3 illustrates the conceptual framework that guides this thesis. Road space allocation is conceived as emerging from the intersection of four constitutive elements. The intersection is not known in advance, but emerges during the allocation of road space. More precisely, how and why elements intersect reflects actors enacting, or seeking to implement, policies aimed at resolving road space allocation tensions. Whereas the constitutive elements account for the what of road space allocation, examining how tensions are engaged provides a lens to understand and examine how and why road space is allocated, or towards what end. As such, examining how tensions are engaged and/or resolved helps reveal and clarify why elements intersected in the manner they did as well as who is engaging where and when and towards what aim.

Figure 2.3: Conceptual framework to examine road space allocation



The conceptual view of road space allocation illustrated in Figure 2.3 helps construct a more detailed and fine-grained understanding of transport planning. Broadly, this helps pinpoint the contours of animate (i.e. transport planner) and inanimate (i.e. road space) agency as highlighted in the mobilities paradigm (Urry, 2008) and pursued actively in studies of technology and science (Biagioli, 1999; Hackett, et al., 2008; Jasanoff, et al., 1995). In particular, this helps reveal how the practice of transport planning is constrained and constituted. For example, as defined earlier, allocating road space often involves determining whether road space is the site of communication, transaction or somewhere in the middle (liveability tension). Thus, examining to what extent the liveability tension is resolved helps reveal how road space allocation emerges from how transport planner, governance, organisational conventions and infrastructure intersect. This definition of engagement helps articulate who is engaging where and when and towards what aim.

2.4.1 Constitutive elements of road space allocation

Transport planner, governance, organisational conventions and infrastructure constitute the elements of road space allocation in this thesis. Transport planner is defined as professionals responsible for allocating road space within metropolitan Melbourne. Governance sets the broad parameters for who can and who cannot allocate what type of road space. This includes state and local laws that determine and shape professional actions at both state and municipal levels. Similarly, organisational conventions reflect formal professional conventions held at both state and local levels. Infrastructure includes technology (e.g. traffic lights) and artefacts (e.g. car).

From the review of the urban studies literature, each of the constitutive elements is portrayed as having dynamic and static properties. Specifically, studies of transport planning generally neglect accounting for material agency, and therefore portray infrastructure as static. Yet, historical urban studies clearly reveal this conceptualisation to be problematic. For example, Norton's (2008) historical analysis into the car's introduction to American cities provides a compelling case for understanding how and why a road's material contours emerge, persist and change. Though obdurate and inanimate, it is how road space is perceived by different actors, which in turn reveals how and why road space is allocated in the manner it was, and towards what end.

Accounting for and tracing the contours of materiality opens up the opportunity to portray infrastructure (i.e. technology and objects) as dynamic in this thesis. Norton

(2008, p. 256) summarises this point succinctly when he concludes a “mother cannot conceive of a street as a playground for her children while a motorist thinks of it a path for driving at speed—at least not for long.” As such, properties which make road space, road space, such as it being flat, with a certain width and constructed of certain materials, remain generally unchanged. Yet, as this thesis will reveal, inanimate elements such as technology and road space provide affordances. The concept of affordance is a key feature of the mobilities paradigm.

Affordances stem from their reciprocity through people’s kinaesthetic movement within their particular world. Affordances constrain behaviour along certain possibilities..... Given certain past and present social relations then particular ‘objects’ in the environment affords possibilities and resistances, given that humans are sensuous, corporeal, technologically extended and mobile beings” (Urry, 2008, p. 50, *italics in original*).

The concept of affordance helps justify the worldview advanced in this thesis regarding how actors perceive and interact with the world around them. What constitutes the social world in general, and what is referred in this thesis as the scientific world of transport planning in particular, “is fundamentally heterogeneous and part of that heterogeneity” are various inanimate elements (i.e. technology, artefacts, road space) “that directly or indirectly move or block the movement of objects, people and information” (Urry, 2008, p. 50). This heterogeneous perspective drives the programme of research for this thesis. In particular, it supports and justifies the assumption that affordance (i.e. agency) explains and/or helps account for the intersection between the constitutive elements and tensions as illustrated in Figure 2.3.

Though infrastructure is a relatively obdurate, it clearly changes, semiotically as discussed in the next section (Pickering, 1995, pp. 12-20), practically (Brown-May, 1998; Clapton, 2005) and materially (Mcshane, 1999). Similarly, viewing organisational conventions and governance as dynamic is equally problematic, as they can equally hold obdurate properties (Curtis & Low, 2012). Interrogating categorical divisions of static and dynamic therefore require additional lines of inquiry to understand how constitutive elements intersect.

The label of transport planner includes professionals at both local and state levels. Thus, any differences held with regard to governance providing greater affordances and thus agency, to professionals at the state level, are empirically understood and accounted for, by examining how different road space allocation tensions are engaged and/or resolved. Similarly, how such tensions are engaged and/or resolved can

equally shed light onto differences in organisational conventions held by state and municipal authorities.

It is assumed that inanimate elements such as road space have powerful spatial fixity that affords possibilities and resistances that linger over time (Urry, 2008). Similarly, aspects of governance are assumed to equally reflect characteristics that appear path-dependent, but which are understood in this thesis as deeply entrenched and stable, and thus also afford possibilities and resistances. Thus, tracing the contours of both human and non-human agency involves paying particular attention to how and why the identified constitutive elements in this thesis, intersect in the manner they do. Again, how these constitutive elements intersect emerges through engaging and/or resolving of one or more tensions.

2.4.2 How and why constitutive elements intersect

The liveability tension relates to the multiple ways that urban space can be understood, engaged with and reacted to or against, or the 'why' of road space allocation. Road space provides a route of communication (e.g. motorised and non-motorised travel, a link between multiple place-spaces) and also a site of transaction (e.g. non mobile access, commercial interactions and transactions, embodied place-spaces) (Roberts, et al., 1999). Central to understanding road space, and thus prioritising communication and transaction properties, are road classifications. Emphasising communication often results in technical solutions for on-road public transport priority travel (Currie & Shalaby, 2007). Emphasising transaction often advances the public's right to use road space as a public place (Fyfe, 1998; Marshall, 2005; Moudon, 1991). In contrast, questioning the bipolar distinction draws attention to the need to create 'great streets' that function as social and cultural moderators (Anderson, 1978; Jacobs, 2001). Under the dominant car paradigm road space is viewed principally a space for mobility. Resolving the liveability tension involves determining whether road space will be allocated based on communication, transaction or somewhere in the middle.

The capacity tension highlights the uncertain shift from the dominant car paradigm occurring in professional transport planning, or the 'how' of road space allocation. Evans et al (1999, pp. 105-107) contend how infrastructure is planned and managed has shifted from a predict-and-provide to a demand management stance. Yet, this shift is "not (yet) a black-boxed category or practice", but a "contested and emergent set of practices" (Evans, et al., 1999, p. 106). Questions therefore remain regarding to what extent transport planners have or are shifting to adopting a demand stance. The

transition requires new professional knowledge and practices that are supported by state policy, legislation and mandates. Evidence strongly suggests that in Victoria, such institutional support has remained limited if not absent (Curtis & Low, 2012; Stone, 2009). Resolving the capacity tension is crucial if transport planners are to determine whether road space is perceived as limitless or constrained.

The network tension draws attention to conflicting needs and priorities of road space allocation at local and metropolitan levels. In the context of road space allocation, continued refinement and reliance on road classifications and eventual expanded application of the conventional road classification hierarchy help resolve both the spatial and network tensions. How this occurs is by applying what is referred to in this thesis as a hierarchy typology (see Chapter 7). The hierarchy typology provides transport planners with a blueprint to merge road classifications (i.e. typology) into the conventional road classification hierarchy (i.e. hierarchy). Before the explosion of the car into urban society, the hierarchy typology provided the traffic engineering profession with a blueprint to curtail the “promiscuous mixing of local and through traffic on the same streets” (Brown, Morris, & Taylor, 2009, p. 163). Post the car’s explosion in urban society, resolution of the network tension has remained principally reconciled by viewing road space as dichotomous rooms and corridors. Some commentators suggest that hierarchies remain an “intrinsic” property of road networks (Yerra & Levinson, 2005). Critical analysis of road classifications and the conventional road classification hierarchy has been examined from the perspective of governance (Brindle, 1999; Goodwin, 1995; Hess, 2009), and urban design (Hebbert, 2005; Marshall, 2005). Lack of critical analysis of how this might occur in transport planning practice remains a lacuna in the urban studies literature. Resolving the network tension is crucial if transport planners are to mitigate issues stemming from competing local and metropolitan road space needs.

The spatial tension highlights the obduracy of road space itself, or the ‘what’ of road space allocation. In the context of road space allocation it is critical to understand the ways in which a road’s material contours of agency come to shape and determine the actions and decisions of transport engaging in the everyday professional practices. Once a road is constructed, or a tram network put into place, the space is largely set. In the case of on-street car parking, such space has the potential to be re-allocated for other purposes, such as extending foot pathways out for non-mobility needs, or giving the space over to other sustainable modes of travel such as bicycles. Consequently, determining whether road space is viewed as a theatre for humans, a mobility conduit,

or a car parking lot, involves knowledgeable actors actively engaging with, reacting to and/or against, the road space in question being allocated.

2.4.3 Conceptualising road space allocation

As detailed up to this point, the worldview that guides this programme of research with respect to how the science of transport planning, comes into conflict with worldviews presented in specific urban study streams. Consequently, though this thesis is not a sociological study into transport planning, the sociology of scientific knowledge provides an epistemology to theoretically interpret road space allocation.

From sociology of scientific knowledge, the elements of scientist, scientific culture and materiality provide a means to identify like-elements in the scientific field of transport planning. What this means for conceptualising and subsequently empirically analysing road space allocation, is that how elements intersect is not known in advance, but emerge during the allocation of road space. This conceptualisation of road space allocation helps justify and explain the conceptual worldview advanced in this thesis in a number of specific and important ways.

First, this conceptualisation of road space allocation opens the door to include inanimate elements; a central conceptual concern within the mobilities paradigm.

Second, whether analysed in historical and contemporary settings, road space allocation is viewed as occurring in real time. This helps account for how agency is constituted and/or constrained. For example, urban studies concerned with practice demonstrate that knowledgeable actors have some level of autonomy that allows them to encourage and promote negotiation and participation as a means to minimise conflict later (Hoch, 1994). Yet, such actors are acknowledged as constrained legislatively, politically and organisationally. Thus, understanding how actors make change involves accounting for when change is made, highlighting the importance of viewing intersecting elements as emerging from/through road space allocation.

Third, this conceptualisation of road space allocation can help reveal the long-term implications that practitioners have in orienting the wider profession, since local solutions become professional traditions (Fischler, 2000a, 2000b). For example, professional transport planners go to work each day with specific duties, such as resolving issues of road congestion. Thus, practitioners apply formalised procedures based on a fact (e.g. road space is congested) (Stopher, 2004), which is supported by a concept (e.g. travel time savings) (Metz, 2008), and a theory (e.g. law of congestion

or peak-hour travel) (Downs, 1962). However, this fact (Mokhtarian, 2004), concept (Metz, 2008) and theory (Mogridge, 1997) remain deeply contested within scholarly and professional circles (Wigan, 2011). Given consensus around congestion has yet to occur in scholarly circles, it is reasonable that practitioners equally hold differing opinions of congestion. This understanding of how consensus is achieved goes to the heart of Giddens's 'duality of structure', where actors draw upon agency to conduct their daily professional duties, and in so doing, legitimise and thus reconstitute, the structures that determine and shape daily professional practice.

Fourth, this conceptualisation of road space allocation provides a philosophical resolution to the theoretical impasse tied to specific urban study streams provide. The implications of this resolution help reveal the "provisional outcome of the "successively faithful reproductions of practice" (Shove, Pantzar, & Watson, 2012, pp. 12-13). This in turn accounts for permanence without resorting to path dependency.

Fifth and final, this conceptualisation of road space allocation can also help offset issues of relativity generated from interpretivist inquiry (Feilzer, 2010; Morgan, 2007). The implications for this with regard to methodology and research methods are taken up in Chapter 3. With regard to critiques made on interpretivist inquiries, Pickering's (1995, pp. 12-20) discussion of semiotics provides insight for sidestepping issues related relativity. As such, it is worth briefly summarising Pickering's main points.

Reconciling issues related to inclusion of materiality in his own study led Pickering to reconcile issues related to semiotics. Semiotics is the science of signs. It "teaches us how to think symmetrically about human and nonhuman agents" (Pickering, 1995, p. 12). Semiotics plays a large role in actor-network theory (Pickering, 1995, pp. 12-20). We saw in Chapter 2 that Latour and Woolgar's (1986) ethnographic work of scientists at work was seminal to the development of sociology of scientific knowledge. This work informed Latour's (2005) later work in developing actor-network theory. Semiotics plays a central role in actor-network theory as well as in science studies concerned with conceptually understanding how scientists (i.e. actors) are symmetrically related with scientific equipment (i.e. materiality). This line of inquiry clearly has implications in conceptualising road space allocation broadly and critiques of relativity in particular.

The relational worldview advanced by semiotics and actor-network theory philosophically aligns with the mobilities paradigm and sociology of scientific knowledge. Yet, importantly, a critical question remains regarding congruity between constitutive elements analysed in this thesis with those found in urban studies. An

Chapter 2 Elements of road space allocation

actor-network position would result in positioning all four constitutive elements symmetrically. Following Pickering's (1995, p. 12, footnote #20) discussion, viewing elements symmetrically is where semiotics and actor-network theory "starts to unravel".

A wide body of evidence indicates all planning decisions are intrinsically political decisions (Flyvbjerg, 1998; Forester, 1989; Halligan, 1982; Klosterman, 1978; Sandercock, 1995). Therefore, it makes little sense to position tram networks or road space as having the same level of agency to that of politicians, practitioners or advocacy groups. The programme of research driving this thesis presumes social constraints placed on knowledgeable actors stem from how actors engage with the world around them, which in turn limits "the kinds of practices" an actor is able to perform (King, 1999, p. 223). This helps to reveal differing 'degrees of freedom' that Archer (1982, p. 461) criticises Giddens's duality of structure fails to provide. Archer (1982) has provided one of the strongest critiques of Giddens's duality of structure. Although agreeing to the essence of Giddens argument, Archer maintains conflating agency and structure fails to provide any analytical room to identify malleability in structural elements. This fails to explain under what conditions change occurs. Although advancing a critique posited as analytical, Archer's critique instead is ontological (King, 1999).

The distinction between analytical and ontological is crucial as the former affords analytical room to examine road space allocation, whereas the latter critique guides Archer's view of the world. The relational view of the world guiding this programme of research assumes that the complexity of the world requires knowledgeable actors to engage with other actors, social institutions and objects. This engagement occurs through routines, since renegotiating the complexity of the world would be difficult, if not impossible (Collins, 1981). As such, governance and organisational conventions are real in the sense they were created from prior interactions between actors, and continue in the present to help simplify a complex web of social processes. Thus, degrees of freedom afforded to practitioners, but constrained by governance and organisational conventions, can be viewed as facilitating particular temporal-spatial activities that overtime appear natural but in fact obfuscate prior negotiations concerning road space allocation (Pratt, 1996). The question then remains as to why and how change occurs through practice, when practices are routines based on bringing order to an otherwise complex world. Addressing this question involves identifying an appropriate methodology and research methods to analytically examine road space allocation, which therefore we now turn our attention.

Chapter 3 – Research design

Identification of the elements of road space allocation in Chapter 2 resulted in developing a conceptual framework to analyse road space allocation. Road space allocation is understood to emerge from the intersection of four constitutive elements. How the elements intersect occurs during resolution of different road space allocation tensions. With the elements of road space allocation now identified, and conceptual framework to theoretically understand the elements now developed, the aim of this chapter is to outline a methodology and set of research methods to empirically analyse road space allocation.

Morse and Richards (2002) discuss two important principles that need attending to when conducting a programme of research such as the one outlined in this chapter, where qualitative research methods constitute a core feature. The authors note the need to ensure both methodological purposiveness and methodological congruence. Purpose directs the research's attention to "particular data sources and analysis strategies" (Morse & Richards, 2002, p. 23). For example, when the purpose of research is to understand a phenomenon in fine-grained detail, or to learn from participants directly to understand how they themselves understand, experience and react to or against their environment. Congruence relates to the different ways in which a researcher can ask and how they will ask specific questions. This directs attention to ensuring "fit between the research problem and the question, fit between the research question and the method... and fit among the method, the data and the way of handling the data" (Morse & Richards, 2002, p. 33). As such, this chapter outlines a methodology and set of research methods that ensure both purpose and congruence are accounted for.

Chapter 2 developed the case for how drawing from studies of science and technology can help advance and add materially to what the transport literature has previously provided on the topic of road space allocation. As such, applying a case study methodology provides an appropriate approach to conducting confirmatory explorative research. Key assumptions contained in John Dewey's transactional realism help justify the decision to apply a case study methodology aimed at articulating a view of transport planners acting in the scientific world of transport planning. Drawing on Dewey's ideas also helps to ensure methodological purpose.

The chapter then outlines a set of research methods analyse road space allocation. Methods include a critical examination of scholarly literature (as conducted in Chapters 1, 2 and this chapter), document analysis, interviews and participant observation. Drawing on studies of technology and science provide a new framing and approach to understand and analyse transport planning. The research methods chosen therefore are not based on triangulating data, but based on reframing transport planning with the explicit purpose of constructing a richer and more complex picture of transport planning. Given the objective of conducting a fine-grained analysis of transport planning advanced by a case study methodology, research methods chosen also help to ensure methodological congruence.

3.1 Methodology

3.1.1 A case study methodology

This research examines how road space is allocated in Melbourne, Australia. As such, it is an applied empirical investigation of historical and contemporary problems and professional practice. John Dewey's pragmatic philosophy and transactional realism highlights the very real challenge of 'acting in the world' (Rud, Garrison, & Stone, 2009). As such, examining Dewey's ideas help justify applying a case study methodology to analyse road space allocation.

According to Dewey, "western philosophy emerged in a society in which knowing was more valued than doing, and in which theory had a much higher status than practice" (Biesta, 2009, p. 39). Dewey perceived a root problem in modern scientific knowledge and its interpretation of reality stemmed from Greek philosophers differentiating between 'spectators' and 'participants'. Idealised knowledge was perceived as being only attainable from the position of a spectator and not as a participant; now labelled 'subjective' and 'objective' knowledge. Dewey developed transactional realism to overcome the spectator-participant dilemma. Transactional realism highlighted how humans remain "already in transaction with the world" from the beginning. It implies the world can only be understood as a function of the ways actors "manipulate, interact with and intervene in the world" (Biesta, 2009, p. 41).

Dewey's ideas are seminal to scholarly "social learning" research concerned with bridging the theory-practice divide (Friedmann, 1987, specifically chapter 5). "As Dewey saw it, we are participants in an un-finished universe rather than spectators of a finished universe", and why our actions, behaviours and social constructions, "have

ontological significance” (Garrison, 1994, p. 8, italics in original). Whereas natural science might perceive reality as sets of atoms, philosophers might perceive reality from the perspective of aesthetic enjoyment or ethical engagement (Biesta, 2009, p. 39). This epistemology suggests a methodology suitable to opening up opportunities to reveal how action and consequence can be brought to bear.

Road space allocation provides a useful exploratory research topic to account for and in turn examine the scientific world of transport planning. Critical attention to the “situated particularities” of professional practice can reveal the “human capacity for social learning and for discovery through experience” (Healey, 2009b, p. 287). Further, Pickering (1995) provides a compelling case for paying closer attention to how actors and technology intersect performing actions and making decisions. Paying particular attention to the mundane activities of professional daily work helps reveal the contours of material agency. As such, paying attention to such situated particulars can be accomplished through a new frame as described in the sociology of scientific knowledge. This frame assumes transport planning is the product of actors negotiating and interpreting meanings and situation, and therefore in a constant state of revision (Blaikie, 1991; Bryman, 2008). Thus, social reality is not a thing to be interpreted in multiple ways; “it is those interpretations” (Blaikie, 1991, p. 120).

Viewing actors as acting in the scientific world of transport planning involves selecting a suitable methodology that supports more fine-grained analysis such as interviews and participant observation. Such research methods are best suited to construct a richer and more complex picture of transport planning than that revealed in more traditional accounts of transport planning practice. This can also help offset issues of relativity generated from interpretivist inquiry (Feilzer, 2010; Morgan, 2007). Chapter 2 developed the case for how drawing from studies of science and technology can help advance and add materially to what the transport literature has previously provided on this topic. As such, applying a case study methodology is useful for conducting confirmatory explorative research.

Scholars have previously documented the merits to conducting a case study of a phenomenon (Babbie, 2001; Bryman, 2008; Yanow & Schwartz-Shea, 2006). Flyvbjerg’s (1998) case study outlined in *Rationality and power* perhaps is one of the better well-known case studies of transport planning. It was during the research project, that Flyvbjerg (2006, p. 79, table 6.1) later identified the different strategies, strengths, weaknesses and purposes for informing a case study approach.

Flyvbjerg (2006, pp. 77-81) provides two overarching case study classifications: 'Random Selection' and 'Information-oriented Selection'. Whereas the former aims to avoid systematic bias with adequate sample size that is generalisable, the latter aims to maximise single cases (Flyvbjerg, 2006, p. 79). Information-oriented case studies are therefore best at revealing a rich array of information and more nuanced depiction of a particular phenomenon. Based on the classifications, Flyvbjerg further identifies four information-oriented case study types: extreme/deviant; maximum variation; critical; and paradigmatic. Whereas extreme/deviant cases represent dramatic events, paradigmatic cases are sufficiently robust to establish core parameters to examine the topic in other settings. In contrast, a critical case "can be defined as having strategic importance in relation to the general problem" (Flyvbjerg, 2006, p. 78). Of the four case study types, examining how road space is allocated in Melbourne meets the criteria of a 'critical' case study.

3.1.2 Melbourne as a critical case study of road space allocation

Melbourne provides an exemplary case study to understand multiple tensions that make allocating road space challenging. As we have seen, current population trends have resulted in more people residing in metropolitan cities (Vallance & Perkins, 2010). In Australia, this situation has existed since the colonisation of Australia. Australia has six states (i.e. New South Wales, Queensland, South Australia, Tasmania, Victoria and Western Australia) and two territories (i.e. Australian Capital Territory and the Northern Territory). Capital cities for each state and territory, including Melbourne, are located along the coastlines of Australia. Yet, Australia's total population is roughly the same as the wider New York metropolitan area, making Australia a highly urbanised country.

Local governments in Australia are generally smaller than their British and North American counterparts. Thus, in law and geographical size, public services generally provided by similar European and North American local governments remain with state or semi-government metropolitan authorities (Neutze, 1978). Melbourne's road space is the product of ideals, legislative acts, and construction and management techniques found in Britain and North America; with greater emphasis on North America (Bell & Bell, 1993; Rolfe, 1998). For example, by 1890, Melbourne was one of a handful of cities in the world with such an advanced and extensive tram system (Davison, 1981; Mees, 2000). Historians contend there isn't one specific reason for why Melbourne kept its trams (Cole, 1996). When most Australian and international cities were removing their trams to make way for the car, trams were re-asserting their presence on

Melbourne's road space. Melbourne's tram network continues to assert its presence in various ways (Currie & Shalaby, 2007). Although international cities such as Portland, Oregon (USA), share a budding tram network and urban planning strategies such as an urban growth boundary, Melbourne's extensive tram network continues to constrain how transport planners allocate road space.

In urban studies, Melbourne is often used to compare against other Australian capital cities such as Perth, as well as international cities such as Vancouver and Toronto, Canada (Legacy, 2010; Mees, 1997; Stone, 2008). The purpose is to understand the strengths or limitations of institutional arrangements found in Victoria, Australia. In this thesis, Melbourne's institutional arrangements are viewed as a key strength with regard to conducting research. As such, examining whether other institutional arrangements found in international cities perhaps are better suited to meeting contemporary mobility challenges is not of concern in this thesis. Instead, institutional arrangements are examined to discern how they constrain and constitute transport planning.

The result of borrowing urban planning and transport techniques from Britain and North America, irrespective of appropriateness to the context of Australia, has helped to create two distinct versions of Melbourne: an inner-urban Melbourne contained roughly inside a 10-kilometre circle around its CBD with high public transport ridership on a network largely unchanged since the 1940s; and an expanding outer-suburban Melbourne lacking public transport service and dominated by car-reliant mobility systems. A recent state parliamentary committee document (OSISDE, 2012) *Inquiry into liveability options in outer suburban Melbourne* examined issues related to the emergence of two Melbournes, and cited issues related to a potential 'liveability gap'. A consultant report "*One Melbourne or two?*" commissioned by the committee concluded that ensuring Melbourne remained a cohesive whole would require investments equivalent to \$9.5 billion (\$ Aus.) by 2026 or cracks would consolidate (Essential Economics, 2012). Melbourne's dominance as the centre of politics, commerce and population is therefore exacerbated by daily travel originating outside the Melbourne CBD with the Melbourne CBD being the destination.

Road space allocation tensions identified in Chapter 2 are therefore particularly dominant and pronounced, making engaging thorny and multifaceted mobility challenges even more perplexing. Understanding these tensions in more detail requires delineating a specific geographical boundary. A boundary can help determine the parameters for examining what road space as well as who is responsible for

allocating such space. As the clearway controversy introduced in Chapter 1 provided a way into understanding the topic of road space allocation, it makes logical sense to contain analysis to the geographical map developed by VicRoads to indicate where clearway operating hours would be extended (Figure 5.8, page 124). Encompassed within this boundary are 13 local government councils. Thus, the boundary provides a suitable boundary to examine road space allocation at a scale larger than the local level, yet suitably constrained to conduct more fine-grained analysis. Unless explicitly noted such as in the case of 'Melbourne CBD', the term 'Melbourne' is defined by this clearway map. The delineation does not reflect the 'Metropolitan Melbourne' census classification. The clearway map provides a concise and useful research boundary to examine how transport planners resolve both local and metropolitan road space needs.

3.2.3 Limitations with a case study methodology

It is important to clarify the limitations for choosing an Australian setting as the object of inquiry. For instance, the Scandinavian approach to road space allocation differs significantly from that found in Australia. Hass-Klau (1990) has previously documented how the Dutch took Buchanan's theoretical ideas of traffic calming at face value and actively chose to translate theory into reality. Social as well as institutional differences help explain the Dutch's readiness to pioneer road space allocation techniques such as Woonerf. Consequently, it is acknowledged that examining aspects of Scandinavian and Dutch practice through a comparative study could reveal strengths and weaknesses to Anglospherical notions around use of road space more generally, and road space allocation in particular.

Chapter 1 made the case for viewing the science of transport planning as being driven by a car paradigm. This paradigm is clearly present in both Scandinavian and non-Scandinavian countries. The Scandinavian model applied to the science of transport planning clearly highlights this. Similarly, Mees (2000) sought to make statements about transport planning practice comparable to cities such as Melbourne. By examining aspects of transport planning in places such as Zurich, Mees was able to make two claims. One, that stabilisation—not reduction—of car traffic had occurred in Zurich, which could be attributed to its world leading public transport system. Two, developing the system stemmed from transport planners in Zurich "acknowledging the need to develop a suite of supportive policy measures to destabilise the dominant car paradigm (Mees, 2000, pp. 27-28). Yet, lessons from examining cities such as Zurich or Holland are well documented and acknowledged, at least at the academic level

(Banister, 2005; Cervero, 1998; Vuchic, 2000). Thus, limitations to conducting a single case study in a city yet to make a more substantive transition towards a sustainable mobility paradigm must be weighed against another important factor, that being time.

Cities that have successfully limited growth in car travel, increased public transport ridership, and re-imagined road space as a theatre for a multitude of activities faced the exact thicket of thorny institutional and implementation problems found in Melbourne today, only much longer ago. Yet, as will be shown in later chapters, the profession of transport planning in Victoria encapsulate a collage of concepts, arguments, theories, conventions and norms which reflect both old and new mobility paradigms. Thus, how road space is allocated in Melbourne is the product of stops and starts. It is not that transport planning in Melbourne has not achieved a comparable level of change documented in Scandinavian and other European cities, but that such change has continued to receive resistance, acceptance, support and often out-right curtailment. Consequently, in allocating road space in Melbourne, transport planners are constrained by a tram network that shares road space with a multitude of modes, as well as 40 years of car-specific infrastructure. Understanding how transport planners resolve and engage issues generated from this situation involves focusing one's entire analytical attention to the subject matter; supporting the decision to choose Melbourne as a single case study worthy of investigation.

In summary, road space allocation provides a useful exploratory research topic to account for and in turn examine the professional world of transport planning. Increasing population trends towards metropolitan cities, unique governing arrangements to Australia in general and Victoria in particular and Melbourne's extensive and very old tram network, all provide important aspects which make Melbourne a critical case study of road space allocation. A case study methodology provides the best lens to understand, document and analyse such particular aspects. Paying attention to the situated particulars can be accomplished through a new frame as described in the sociology of scientific knowledge. Though attributes that make Melbourne a critical case study constrain generalising findings, limitations can be offset by stronger capacity for theory building (Bryman, 2008). Specifically, drawing from studies of science and technology can help advance and add materially to what the transport literature has previously provided on this topic, in areas which been suggested by others (principally in non-urban studies literature), but which confirmatory explorative research had not yet been conducted.

Understanding of day-to-day professional practices requires research methods which can articulate the science of transport planning beyond a picture based on an idealised form of rule-following. To develop this picture, material incorporated as part of this research programme is drawn upon from a critical examination of scholarly literature, document analysis, face-to-face interviews and participant observation. Each method is detailed below in turn.

3.2 Document analysis

3.2.1 Review of literature

The purpose in conducting a review of the literature is to identify and synthesise key debates and concepts relevant to the research questions (Hart, 1998). In regards to the topic of transport planning more generally and the particular object of inquiry of road space allocation, several limitations and issues were clarified in Chapter 1. It is worth briefly summarising them here again as they help justify what literature was reviewed, and how such literature was interrogated. First, the term urban studies was introduced as it covered transport planning from a variety of angles related to policy, practice and governance. Second, as we saw in Chapter 2, urban studies draw different theories from academic disciplines such as geography and sociology, or economic, political or organisational studies. This results in divergent theoretical accounts for understanding how transport planning practice is constrained and constituted. Third, road space allocation is discussed principally in transport planning under specific programmes and road measures. The mobilities paradigm broadens the world view to include road space allocation.

Therefore, the literature review conducted for this study specifically involved identifying literature which could help broaden the scope in which to view road space allocation. In so doing, it was central to ensure elements traditionally understood and analysed in urban studies were accounted for, but that such elements were read with a critical lens given the worldview outlined by a mobilities paradigm. Specifically, literature was sought out with the objective of ensuring a broad overview and understanding of issues related to governance, professional practice and policy was achieved as such concerns relate to transport planning. Literature included international research, but focuses remained primarily on important urban studies specific to the Australian context in general, and Victoria in particular.

3.2.2 Archival research

The review of literature is supported by archival material. Historical urban studies have increasingly begun to provide new insight into how early urban street life was contested, both well before, as well as after the car's arrival (Clapton, 2005; Ehrenfeucht & Loukaitou-Sideris, 2007; Norton, 2008). Evidence from this growing body of research clearly underscores viewing conflicts such as the clearway controversy as the tip of a much larger iceberg whose history led to the controversy. This history is not the product of a path-dependent line of debates, but a web of ebbing debates that society and professionals have travelled. As revealed in Chapter 5, the clearway controversy clearly highlights, ebbing public debate is once again questioning the car's place in urban society more generally and its place on increasingly constrained road space specifically.

To develop greater insight into the clearway controversy, newspaper articles from *The Argus*, *The Age* and *The Sun* between 1900 and 1970 are examined. Given the nature of the clearway controversy, selection of newspaper articles is based on specific search terms (i.e. parking regulation, parking problem, traffic, kerb parking, parking ban, trams, angle parking owner-onus and clearways). Based on these search words, approximately 694 articles (*The Argus* – 425; *The Age* – 248; *The Sun* – 21) are reviewed. The articles are evaluated against the contingent conditions and authenticity based on the authorial observer (Howell & Prevenier, 2001). Although there are clear differences between early road space controversies and those found today, conducting archival research help shed light on themes common to both historical and contemporary debates.

3.2.3 Policy analysis

Analysing pertinent policy and legislative documents provides a bridge to the archival research, and builds on previous historical studies of Melbourne (Curtis & Low, 2012; Mees, 2000; Stone, 2008). Document analysis focuses specifically on government documents relevant to road space allocation, annual reports for state authorities charged with road space allocation and legislative acts that delineate governing responsibilities for allocating road space. Annual reports are examined to compare benchmarks against measurement criteria and to identify themes in governance. Compared to the UK or North America, in Australia, states and territories have significantly more authority and responsibility for public service provision (Parkin, 1982). This institutional landscape has significant implications for how urban space is

regulated in Melbourne (Low, 1994). Legislative acts are therefore examined to understand the broad rules that determine how road space is allocated in Melbourne (summarised in Appendix 3). Tabulating the legislative acts provides a method to identifying acts meriting further analysis of related *Hansard* Parliament summaries. A total of 10 *Hansard* summaries are examined for the: 1909 *Motor Car Act*; 1912 *Victorian Country Roads Act*; 1928 *Local Government Act*; 1932 *Transport Regulation Act*; 1953 *Parking of Vehicles Act*; 1956 *Road Traffic Act*; 1970 *Road Traffic (Road Safety and Traffic Authority) Act*; 1983 *Transport Act*; 2004 *Road Management Act*; and 2010 *Integrated Transport Act*.

3.3 Interviews

Analysing scholarly literature, government documents and archival materials is important to provide context to understand road space allocation. However, the fine-grained analysis advanced by a case study methodology requires research methods suitable to reveal more nuanced aspects of professional practice. Face-to-face interviews are ideal for such research needs.

3.3.1 Connecting interview questions with literature

Significant energy has been given to studying and theorising professional urban planning practice (Forester, 1989, 1999; Healey, 2009a; Hoch, 1994; Watson, 2002). In comparison, urban studies of transport planning practice tend to focus on failed projects (Flyvbjerg, 1998), explain disagreements (Tennøy, 2010) or to supplement policy analysis (Curtis & Low, 2012; Langmyhr, 2001; Vigar, 2002). However, everyday practitioners face questions that have yet to be resolved by scholars, but which require using processes yet to be formally institutionalised (Healey, 2009a, 2009b). Thus, insight from interviews can reveal the reflections and experiences of professionals that were, metaphorically speaking, working directly on the firing lines or at the 'coalface' of transport planning (Healey, 1997; Hoch, 1994; Lash, 1976).

Given today's complex mobility challenges, professionals are re-examining their place in the wider planning arena (Evans, et al., 1999). In many countries including Australia, the trend towards increased privatisation transfers planning skill sets and knowledge from the public to the private sector (Alford & O'Flynn, 2012; Aulich & O'Flynn, 2007). This has resulted in a hybridised planning profession, where practitioners are questioning what it means to be a professional (Steele, 2009; Vigar, 2012). Understanding to what extent, if any, this hybridisation can be seen in transport

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planning practice, and if so, to what extent does disciplinary knowledge constrain transport planning practice.

Urban studies of transport planning have applied different interview selection criteria. Flyvbjerg (1997) selected interview subjects based on their key positions and knowledge, often interviewing participants on multiple occasions. Vigar (2002) used the term stakeholder, to encompass professionals, policy makers, advocates and general public. The aim was to highlight groups that often remain absent from policy debates. Based on the topic of inquiry guiding this thesis, professional transport planners active in road space allocation are determined as most appropriate to interview (per definition of transport planning identified in Chapter 2).

It was mentioned in Chapter 2 that urban studies have begun to recognise how the dominance of traffic engineering and economics in transport planning might constrain and constitute transport planning. Yet, such findings are often not critically examined in any extensive detail. Table 3.1 identifies the educational qualifications for each of the transport planners interviewed.

Table 3.1: Information on participants, by education

	Total	VicRoads	DOT	DPCD	Council	Other (e.g. Yara Trams)
Bachelor, Civil/Traffic Engineering	34	16	7	0	8	3
Bachelor, Planning or Geography	9	1	1	3	4	0
Bachelor, Economics, Politics or Law	7	0	2	2	2	1
Bachelor, Architecture and Applied Science*	12	0	3	1	5	3
Masters, Planning, Urban Geography, or Urban	3	0	0	1	2	0
Masters, Economics, Politics or MBA	3	0	2	0	1	0
Masters, Traffic and Transport	5	3	2	0	0	0
Masters, Public Health or Policy or Social Ecology	4	0	1	0	0	3
PhD	1	0	1	0	0	0
2 Degrees or more	16	3	5	2	6	0
Number of postgraduate or higher degrees	15	3	5	1	6	0
Number of Civil/Traffic Engineer degrees with postgraduate	7	2	3	0	2	0

* Note: Applied sciences include Speech Pathology, Graphic Design, Astrophysics, Computer Science, Public Health or Policy, Social Work

The importance that knowledge held within different disciplines is discussed in more detail in Chapter 8. On average, more than half of the interview participants had either/both a civil or traffic engineering degree. The two primary state authorities of VicRoads and DOT contain a large proportion of transport planners with traffic engineering degrees, compared with DPCD, which had none. This does not suggest that DPCD staff do not hold engineering degrees, but this reflects two points: 1. the types of transport planning topic of this research, and 2. the separation of land use and transport.

In total, 61 interviews were conducted. Roughly 20 transport planners are interviewed regarding the Clearway controversy, 35 regarding *SmartRoads*, 5 are in conjunction with participant observation, and 5 are conducted with retired transport planners. Data from all 61 interviews as well as data collected from observation study are coded and analysed through the use of QSR NVivo 10.0 software, a qualitative data analysis software package.

3.3.2 Anonymity

Interview participants are anonymous in this study. Anonymity is achieved by categorising interview participants into three categories of project manager, junior manager and senior decision maker which are identified in Table 3.2.

Table 3.2: Grouping of interview participants

	TOTAL	STATE (VicRoads, DPCD, DOT)	LOCAL COUNCIL	ADVOCACY (BusVic, RACV, Yarra Trams)
Project manager	11	9 (15%)	2 (3%)	0 (0%)
Junior manager	25	19 (31%)	6 (10%)	0 (0%)
Senior decision maker	25	8 (13%)	11 (18%)	6 (10%)
Total Participants	61	36 (59%)	19 (31%)	6 (9%)

Categories identified accomplished two important tasks. The first was to ensure anonymity for interview participants and the second was to help resolve methodological concerns. Ensuring anonymity assisted in shifting attention to interview data and away from specific professionals themselves. This provided a way to compare and contrast participants from the state planning authorities of DPCD, DOT and VicRoads, different advocacy coalitions as well as local councils. Additionally, the categories reflect a

more explicit hierarchical level of power in relation to a participant's professional role. It was presumed that a senior decision maker had some level of control over transport planners below them. However, the ability to define compatibility by a participant's professional title or similar location within a local or state planning authority could only be extended so far. A similar issue arose when attempting to compare or contrast findings derived from interviews regardless of location or title. The hierarchical concept of power is assumed to provide only a partial account for the level of agency that a participant may have with regard to their role in road space allocation. Accounting for agency is analytically addressed by reconciling comparability and compatibility.

In relation to addressing compatibility, a senior decision maker was defined first by whether their name appeared on an organisational chart. Second, participants classified as senior decision maker were also checked against the number of years of professional experience and number of staff charged to them. A junior manager was defined first by their relationship to the senior decision maker. Although such participants did not appear on an organisational chart, interviews often revealed that such participants had previously held or were holding senior roles for a short time. The shift between roles was found to be due for various reasons such as personal reasons, professional development, or secondment within the planning authority or across to another planning authority. Second, junior managers are also oversee staff—less compared to senior decision makers—share a similar number of years of professional experience with senior decision makes. A project manager was defined in relation to their immediate junior manager and/or their senior decision maker. Such participants sometimes were charged with overseeing one or two staff depending on their project but in general were tied to a specific role. Additionally, most project managers had less professional experience compared to junior management or senior decision makers.

In relation to addressing comparability, a senior decision maker identified in a state planning authority such as VicRoads or DOT was determined to not be directly compared to a senior decision maker at a local council. The legislative purview or mandates bestowed to local and state planning agencies is very different as well as the size of organisation. Again, the main aim of the thesis is to examine road space allocation. As later chapters demonstrate, although legislative purview and mandates have a significant role in determining the conventions and routines around how and who is charged with allocating road space, material changes to road space itself most often has little to do with legislative mandates and more to do with complex interwoven contingencies and circumstances.

From a more strict organisational perspective, the organisational structure of local and state planning authorities has remained relatively constant. For instance, in the case of a local council, the CEO is council-appointed and is charged for operational matters of the local council. The CEO will generally have weekly meetings with the council's division directors such as the division of Community Services, Assets and Infrastructure or Environment and Planning. The CEO and division directors comprise the Executive Management Team. The divisions are generally siloed and constituted by a staff of professional planners with specific education and professional skill sets and body of knowledge. Divisions are then further subdivided by area. For instance, in the Council of Yarra, the City Development Division is comprised of Major Projects, Regulatory Services, Statutory Planning, Parking Services, Strategic and Economic Planning and Strategic Transport and Environment. Although senior staff comprised within a division does not constitute an Executive Management team, the division's director and managers for each division area all include senior decision makers.

The state planning authorities examined in this thesis share a similar organisational structure when compared to their local council counterparts. For instance, the CEO for VicRoads is appointed by the Governor in Council and is charged for operational matters of VicRoads. The CEO will generally have weekly meetings with the authority's division directors such as the division of Network and Asset Planning, Major Projects and Regional Services. The CEO and division directors comprise the Corporate or Executive Management Team. Similar to local councils, divisions within VicRoads are then further subdivided by area such as Network Improvements, Asset Management and Network Planning and Policy under the Network and Asset Planning division. Although senior staff comprised within a division does not constitute an Executive Management Team, the division's director and managers for each division area all include senior decision makers.

3.3.3 Interview protocol

The development of the interview schedule and interview protocol was based on Strauss and Corbin's (1998) discussion that questioning and inquiry go together. The scholars contend that questioning and inquiry are best expressed as nouns - in that they require actions such as "asking, doing, locating and searching" (1998, p. 74). Therefore, changes to the interview protocol reflect the methodological choice to interview more senior professionals towards the end of the study. Both the semi-structured interview protocol and snowballing interview technique carry strengths and

weaknesses. The prospective for quantitative analysis is limited. However, application of both can provide new insights that a more structured standardised interview schedule would not offer. This can open up opportunities for unexpected learning. The benefit in conducting semi-structure interviews is therefore that new and unexpected stories, and unexpected research avenues, can and do emerge, which happened during the course in conducting interviews for this thesis project. As shown in later chapters, the opportunity for unexpected avenues for research reshaped and improved this study, and subsequently enhanced the study's overall contribution.

Interviews conducted for this research follow a non-random purposive sample selection. A semi-structured interview protocol is adopted (Denscombe, 2001); and a snowball interview technique applied (Bryman, 2008; Neuman, 2011). Initially, interview participants were chosen based on their role in Clearways. Re-assessing the original interview protocol was accomplished after a point of saturation was identified (Lincoln & Guba, 1985). The analysis of archival and state government documents assisted with interpreting themes that arose from interviews. As a theme emerged from analysing interview data, further archival work was conducted. This reflexive approach to analysing interview data helped to ascertain to what extent a concern, issue or topic identified from an interview, reflected a new or pre-existing issue from Melbourne's longer history.

First point of contact for interview participants was telephone and/or email. Second point of contact was an email that re-stated the research, outlined a brief summary of the types of interview questions and included a Plain Language Statement (PLS). Consent Forms were provided to interview participants prior to the interview being conducted (Both PLS and Consent Form are in Appendix 2). The purpose of distributing the PLS and Consent Form prior to the interview was to clearly articulate the aims of the research. Along with required information regarding the significance of the research and associated ethics statements, the PLS outlined that all interview participants would remain anonymous in the thesis as well as well as subsequent publications that might emerge from the research. Both the ethical duties and requirement of anonymity were re-stated prior to conducting the interview.

In structured interviews, the interviewer retains a clear list of issues and questions. In contrast, in semi-structured or unstructured interviews, a theme or topic is introduced, and the interviewee is then allowed to develop their ideas and pursue their own train of thought (Denscombe, 2001, p. 113). A sliding scale between semi-structured and

unstructured interviews was determined as most appropriate. The semi-structure provided for a robust discussion but allowed for unexpected emergent issues. Except for a few interviews, participants were asked five standardised questions:

1. Previous professional experience, current and cumulative work tenure
2. Whether they considered themselves to be an expert
3. Whether or not they had a specific client/customer in mind when working
4. How they knew they were making more right decisions than bad ones.
5. How they generally commuted to work

Interviews began by asking participants to describe their day-to-day tasks, and then moved to broader questions related to topics such as Clearways and Network Operating Plans. Interviews began with introductory questions such as having participants describe their daily duties and to describe what if any changes they have seen in regards to their own professional routines, conventions and practices and/or changes that they have witnessed occurring within the wider professional planning world in Victoria. Interview participants then followed a more conversational format.

In arguing for qualitative approaches to examine issues related to travel, Roe (2000, p. 104) warns that the research process “should not be seen as a fixed sequence of operations... [but] rather a reflexive process of re-examining, repetition, and refining.” Although such a method is more closely aligned with Grounded Theory (Corbin & Strauss, 1990; Glaser & Strauss, 1967)—for more detailed discussion on theory see (Strauss, 1987)—Roe’s warning highlights the complex yet unique opportunity in conducting qualitative research, and stresses the differences between the positivistic and anti-positivistic paradigms. A central concern during the data collection process is ensuring sufficient time is set aside to become familiar with the data. This assisted in overcoming two primary concerns.

First, given the significant time invested in conducting the interviews themselves as well as transcribing the interviews, it is essential to determine whether interview participants are eliciting new and different information than that found in the urban studies literature. A small window exists in which to consider changing the interview programme questions or focus, and it was central to determine within a short timeframe whether a topic or theme articulated during an interview reflected something of sufficient importance and worthy of further investigation that potentially may send the research into a new and unexplored avenue.

Secondly, reflexively examining interview data helps determine when critical mass is reached; often referred to a “saturation point” (Glaser & Strauss, 1967, p. 61). Saturation reflects a point in analysis where new or different findings are no longer being articulated by the existing methods (Yin, 1994, chapter 4). Reaching critical mass requires a reflexive review of the interview data to explore new avenues of interest (Røe, 2000). Unfortunately, this process often equates to not knowing the question until you see it, which can be problematic, but not unsolvable (Lincoln & Guba, 1985). The identification of the Network Operating Plans fit Lincoln and Guba's concern of not knowing a question until it was discovered.

3.3.4 Accounting for interview bias and validity

Several potential biases exist with interviewing professional planners. These biases stem from the use of a non-random purposive sample selection and possibility of ensuring “good”, “useful”, and “truthful” data.

First, when conducting research on a contemporary subject there are layers of potential issues and pitfalls one must negotiate. The first major pitfall that had to be negotiated related to access. Non-random purposive interviews assists in navigating the access question, but fall prey to issues related to validity. The research programme described here relies on a critical ethnomethodological scepticism towards emic and etic perspectives (Fetterman, 1998, pp. 20-22). Whereas an etic perspective provides an “outsider” perspective to a social phenomenon, an emic perspective provides more involves naturalistic methods to immerse the researcher within a culture and report informants' stories as if they represented reality. Research time constraints coupled with the original research focus of articulating how planners determined appropriate use of road space versus why made adopting ethnographic methods both challenging and inappropriate. Non-random purposive interviews with professional planners provided the best method to begin understanding and describing how professional transport planners in Melbourne engage and resolve road space allocation tensions. The majority of interviews were contained to roughly a one hour and conducted in a meeting room or participant's primary office within the respective planning organisations. Conducting interviews at a participant's workplace afforded opportunities to observe the environment in which daily planning conventions and professional routines occurred. However, it became clear early on in the research process that it was often difficult for interview participants to ‘switch’ their perspective from a ‘professional’ working lens to a more ‘reflexive’ critical lens. Interview participants that

successfully made the switch provided significantly more detail around what constituted their daily planning routines, why they did the daily actions and routines they did, and were more often able to identify and account how their professional practices and routines had altered or remained stable over the years.

Secondly, the task of gaining 'good', 'useful', and 'truthful' data is another concern in conducting interviews. "Ultimately, there is not absolute way of verifying what someone tells you about their thoughts and feelings" (Denscombe, 2001, p. 132). Using the clearway controversy as a starting point for interviews accomplished two goals. First, it provided a way into the professional transport planning world. Participants were initially identified in relation to their role with clearways. The debate also provided a 'point-of-interest' to constrain the interview discussion, but not to the determinant of the interview. It was essential to have a level of critical scepticism to "'make sense' out of the informants' perceptions of the world" (Babbie, 2001, p. 282). Clearways provided a heated topic to elicit a participant's knowledge. Yet, interview questions sought to contextualise a participant's knowledge against their daily professional routines. Explaining the rationale for the interview questions took time, but assisted in obtaining more detailed informant or insider (i.e. professional transport planner) knowledge, practices and routines pertinent to depicting how road space allocation was performed.

Overcoming the biases identified above came about from the conducting the research in a more exploratory manner. It was previously discussed that identification of the Network Operating Plans fit Lincoln and Guba's concern of not knowing a question until it was discovered. As the interview process continued, participants continued to identify the recent movement within VicRoads to implement Network Operating Plans as a mechanism to assist resolving the network tension.

Identification of the Network Operating Plans strengthened the validity of research aided in reconciling issues in bias interview in several ways. Participants continually emphasised the new approach that VicRoads was implementing with regard to road space allocation. The belief that the approach was new provided a lens to critically interrogate the approach from an historical perspective to ascertain whether similar or different approaches had previously been attempted. The historical analysis not only uncovered similar attempts, but provided a means to contextualise *SmartRoads*. This in turn provided another means to account for interview bias.

Identification of the Network Operating Plans also provided additional validity to the research in three important ways. It helped identify transport planners engaged with

non-traditional or non-conventional ways of road space allocation. Identification of such individuals provided for a more robust and complex picture of the professional planning world. Second, interviews that switched focus to understanding the recent uptake of the Network Operating Plans provided a sounding board to reflect on data from interviews that centred primarily on the clearway debate. Finally, repeated interviews with several VicRoads' transport planners opened up the opportunity to observe first-hand how transport planners perform road space allocation.

3.4 Participant observation

The topic of Network Operating Plans and *SmartRoads* continually surfaced during interviews with practitioners regarding clearways. As the document analysis had not uncovered this theme, it was determined to warrant further investigation.

Investigation was accomplished by conducting participant observation, an ethnographic method. Participant observation involves 'direct observation' for a sustained period with the research subject in its natural settings (Lofland & Lofland, 1995). The assumption is that "observational strategies" such as watching and listening enable researchers "to learn what is taken for granted in a situation and to discover what is going on" (Morse & Richards, 2002, p. 96). Thus, non-participant observation afforded an unexpected opportunity to document the unfolding of transport planners performing road space allocation in real-time, up-close and first hand.

3.4.1 Identification of council chosen for participant observation

The council chosen for observation was based on input from interview participants. Council A (pseudonym) is located roughly 20 kilometres from the Melbourne CBD (Appendix 1 includes census information). As the crow flies, half of the Council's boundaries fell within the 10 kilometre clearway circle (see Figure 5.8, page 124).

One VicRoads staff member based in the Network Operating Planning division became a central contact for information, such as helping to develop a more detailed understanding of the process itself and pointing to relevant individuals with knowledge and insight worth contacting for interviews. Several conversations over the telephone, at their office, or observation (staff member took part in workshop) occurred after the formal interview. The conversations were not recorded. A professional rapport developed with the VicRoads contact, with the individual taking an interest in the thesis project. The rapport allowed for more critical engagement around the topic of road space allocation more broadly, and with *SmartRoads* in particular. It was during a

conversation in which the topic of perhaps observing first-hand *SmartRoads* where the VicRoads contact remarked that the Network team had just completed one such project, but that they would keep a look out for future workshops suitable as a candidate to conduct non-participant observation research.

3.4.2 Rationale for participant observation

A Network Operating Plan (NOP) workshop was eventually identified as a candidate for non-participant observation. Several workshop participants from VicRoads had already been interviewed prior to the workshop. Interviews revealed that *SmartRoads* had remained largely applied to more inner urban councils. The rationale for the Network Operating Team focusing on inner urban councils was several fold: primarily because the Team was still finalising the larger process, methods and tools of *SmartRoads*, and primarily because road space allocation challenges, related to mixing of buses, trams, motor cars, freight, cyclists and pedestrians, were primarily the challenges facing already established inner-urban councils. However, unlike inner-urban councils such as Stonnington and Yarra, council staff at Council A and residents did not actively engage with the clearway controversy. Thus, Council A provided a unique opportunity to observe how *SmartRoads* redressed road space allocation tensions different to those found in inner-urban councils.

3.4.3 Participant observation protocol

The original aim of conducting non-participant observations was to document a before and after account of road space allocation. This required interviewing participants prior to the first workshop, and then compare findings from interviews after the exercise was finalised. However, investigating a real-world transport planning topic resulted in real-world contingencies and circumstances impacting analysis. Scheduling issues, and real-world professional issues, such as time-sensitive dead-lines, delays in returning phone messages/emails and issues with obtaining additional Ethics clearance, all collectively resulted in the final identification of a NOP workshop, having already begun and in progress. Consequently, pre-interviews occurred after the third workshop.

The entire NOP workshop exercise consisted of five separate meetings. Of the five, participant observation occurred only in the last two workshops. The position taken within the two workshops was non-participant. In the first workshop (4th overall), I was positioned in the back of the room adjacent to other participants in a room containing roughly 20 participants. In the second workshop (5th overall), I was positioned at the

meeting table in a room with four other participants. Yet, the distinction between active and non-active participant clouds the extent to which my physical presence altered—even in the slightest manner—the outcome of the workshops. “No observer is entirely a participant, and it is impossible to observe in almost every non-experimental situation without some participation” (Morse & Richards, 2002, p. 96). This point was made clear in the 4th meeting when a participant made a comment, and then quickly stated out loud that we should be careful what we say, as we’re being recorded. In retrospect, it is reasonable to conclude my presence did not influence workshop outcomes.

Both workshops were recorded, with parts transcribed, coded and analysed through QSR NVivo 10.0 software. In addition to non-participant observation and recording workshop meetings, interviews were conducted with workshop participants. Interviews contained five questions asked to all interview participants for purpose of consistency, but were primarily directed around the meetings observed.

3.4.4 Transport planning and local councils

Observing transport planners in real time—particularly at the local level—led to a discovery concerning transport planning and local government. Specifically, local governments in Victoria are not required by state law to have a local transport planner or professional with transport planning expertise and/or experience on staff. This fact emerged as relevant during discussions with staff from Council A concerning the need to balance multiple disciplinary roles within council. In the case of Council A, the planner charged with transport planning was educated primarily as a town planner, but had recently been placed in the dual role of addressing council issues related to both traditional planning concerns such as zoning, as well as transport planning.

To determine the prevalence of this situation, a telephone survey was conducted by the researcher with councils based on council boundaries intersecting with the 10 kilometre clearway circle (see Figure 5.8, page 124). In total, 12 local governments were contacted. Appropriate contacts were determined by enquiring into whom within the council, was charged with engaging in transport-related planning concerns. Additionally, each contact was asked whether the council had developed a specific transport plan. Chapter 8 discusses the findings of the survey.

3.5 Synthesising research design

In way of summary, the conceptual framework that drives the programme of research for this thesis views road space allocation as emerging from the intersection of four

constitutive elements. The conceptual framework is grounded by the mobilities paradigm. The sociology of scientific knowledge provides an epistemology to theoretically interpret road space allocation. Dewey's transactional realism help justify the decision to apply a case study methodology aimed at articulating a view of transport planners acting in the scientific world of transport planning. This helps to ensure methodological purpose. Research methods chosen are therefore based on reframing transport planning with the explicit purpose of constructing a richer and more complex picture of transport planning. The research methods also help to ensure methodological congruence.

How the constitutive elements of road space allocation intersect is not known in advance, but emerges during the allocation of road space. As such, examining how one or more road space allocation tensions are resolved can reveal and clarify why elements intersected in the manner they did. For example, the actions of transport planners are often principally driven by policies established at political levels, which are in turn constrained by legislation, organisational conventions and governance. Subsequently, empirically analysing road space allocation first requires an understanding of the rules that govern road space allocation. Identifying and examining such rules is therefore where we turn our attention to now.

Chapter 4 – Governance of road space allocation

This chapter identifies and examines the rules that govern road space allocation in Melbourne, Australia. This is the first of four key objectives outlined in Chapter 1. Specifically, this chapter covers governance in particular and organisational conventions more broadly. The material for this chapter is taken from a variety of key sources including Davison (1981; 2004), Dingle and Rasmussen (1991), Holmes (1976, 1984), Lay (1984, 2003), Mees (2000), and Stone (2008), and original archival material from government policy documents and parliamentary documents.

Chapter 2 outlined how legislative acts are a defining characteristic of governance, and how organisational conventions and formal professional conventions guide engagement of road space allocation tensions. Understanding these two constitutive elements of road space allocation provide crucial background for later chapters analysing road space allocation. Governance and organisational conventions set the broad parameters for who can and who cannot allocate what type of road space. Understanding these broad parameters involves examining specific aspects related to the political machinery of federal, state and local government for Australia, with primary concern placed on the administrative machinery of government as it relates to road space allocation and the governance of transport. Although both land use and transport inform road space allocation, transport authorities continue to play a larger role, and therefore remain the primary focus in this chapter.

We begin by summarising the basic urban geography and history of Melbourne. We then trace the governance parameters that have historically determined who is charged with allocating road space in Melbourne. Examining the history of governance of urban mobility in Melbourne reveals a compelling picture of remarkably stable institutional structures. State road authorities are founded to have a dominate role in road space allocation. The dominance is supported, stabilised and entrenched by road classifications. We saw in Chapter 2 that road classifications play a crucial role in resolving the liveability tension. This chapter reveals that road classifications also help establish governance of road space allocation. The chapter concludes by discussing how governance remains largely unchanged from pre-car ways of governing, with similarly stable divisions of professional competencies and fields of responsibility.

4.1 Placing Melbourne in context

The City of Melbourne is the capital city of Victoria and Australia's second largest city. The population of metropolitan Melbourne (defined by census) in 2011 was 4.16 million (ABS, 2012). Melbourne's history is not unlike that of other large urban cities found in the world. It was established close to fresh water, and its first roads were created by different native Aboriginals tribes, and resembled paths developed over decades based on a tribe's food, water, spiritual and social needs. The first non-aboriginal road was constructed in December 1801 on Seal Island, roughly 200 kilometres from the Melbourne CBD. The road was built for "military rather than settlement purposes and constructed by naval personnel rather than by civilian labour" (Anderson, 1994, p. 4).

Between 1881 to 1901, Melbourne's population doubled from 268,000 to 500,000 (Proudfoot, 2000). The growth impacted public transport systems, local and state economies, and Melbourne's overall urban morphology. Three factors contributed to Melbourne's growth: the gold-rush period between 1850-1860, which laid the groundwork to generate extensive and diverse trades and products for exportation, coupled with high Victorian government tariffs that protected local industry (Priestley, 1984). Many historians regard Melbourne's early period from 1880 to 1900 as one when the city transitioned from a walking city to a public transport city (Davison, 1981; McCarty, 1970). Melbourne's multi-modal public transport network remains radial (i.e. the network resembles a spider web centrally focused on the CBD).

Although Melbourne has retained its extensive tram network, OECD countries almost universally removed their tram networks. Yet, similar to OCED countries, growth in car ownership and travel in Victoria has continued to grow (see Chapter 1). In many ways Melbourne therefore contains two worlds – a densely urbanised core and surrounding inner-urban ring more commonly associated with European cities, and smaller suburban council precincts based on car-reliant infrastructure (Essential Economics, 2012; OSISDE, 2012). These two worlds are distinct from one another in socio-economic status, employment type and density, built landscape and available transportation options (Gleeson, Dodson, & Spiller, 2012; SGS, 2013). Melbourne's unique political, social and cultural history certainly helped to shape the Melbourne of today. Yet, continuity of infrastructure such as the tram network also established an urban morphology that in turn created road space allocation tensions identified in Chapter 2. To understand how these tensions are resolved, we turn our attention to identifying the broad rules that govern road space allocation in Melbourne, Australia.

4.2 Tracing the boundaries for road space allocation

4.2.1 Governance boundaries of road space allocation

In Victoria today, governing responsibility for roads, in terms of ownership, funding, maintenance and regulation remains complex, yet significantly less complex than has been historically. Such concerns are principally driven by the *2004 Road Management Act* (State of Victoria, 11 May 2004). The state government (principally through VicRoads but also including other state authorities) owns declared roads, and is subsequently charged with funding and maintaining such roads. All other non-declared roads with regards to ownership, funding and maintenance fall under local council government purview. In terms of regulating, such duties fall to various state authorities or local governments, depending on road. These governing arrangements reflect formalised government and organisational structures which are generally established by legislation, laws and constitutions.

The Australian government is a three tiered system, a composite of England's Westminster and US federal senate systems (Parkin, 1982). There is a federal government (federal or Commonwealth); six state and two territory governments (state); and smaller governments (local government, council or shire). The Commonwealth and each state have a constitution. In general terms, the Commonwealth is responsible for matters concerning the whole country and states are responsible for matters particular to their geographic territory (Althaus, Bridgman, & Davis, 2007). In many ways, governance of road space allocation has changed very little over the past century. This does not suggest that governance of road space allocation have not changed only that the wide parameters in which such change has and does occur is restricted.

Holmes (1984, p. 103) described Victoria's early governance as "socialism sans doctrines", which allowed the state government to provide public services in a manner that minimised conflicts with business interests and fostered private enterprise. From very early on, large state enterprises that covered diverse statutory authorities from water and electricity supply to transport operations was the *modus operandi* for Victoria (Halligan, 1982). The institutional arrangements resulted in parliament establishing policies with more detailed implementation left largely to statutory authorities (Halligan, 1982). Different and often competing authorities advocated different implementation programmes—often outside of more direct ministerial control (Holmes, 1976). For example, the Railway Construction Board (RCB) and the Victorian Railways Board

(VRB) were responsible for tram, bus and rail transport. Railways played a prominent role in Victorian politics. In an “era of deal-making” (Strangio & Costar, 2006, p. 8) state government and private spending on railways reinforced its importance in Melbourne as a “principal engine of growth and politicians often profited directly through corrupt land speculation or indirectly through railway expansion” (Stone, 2008, p. 106).

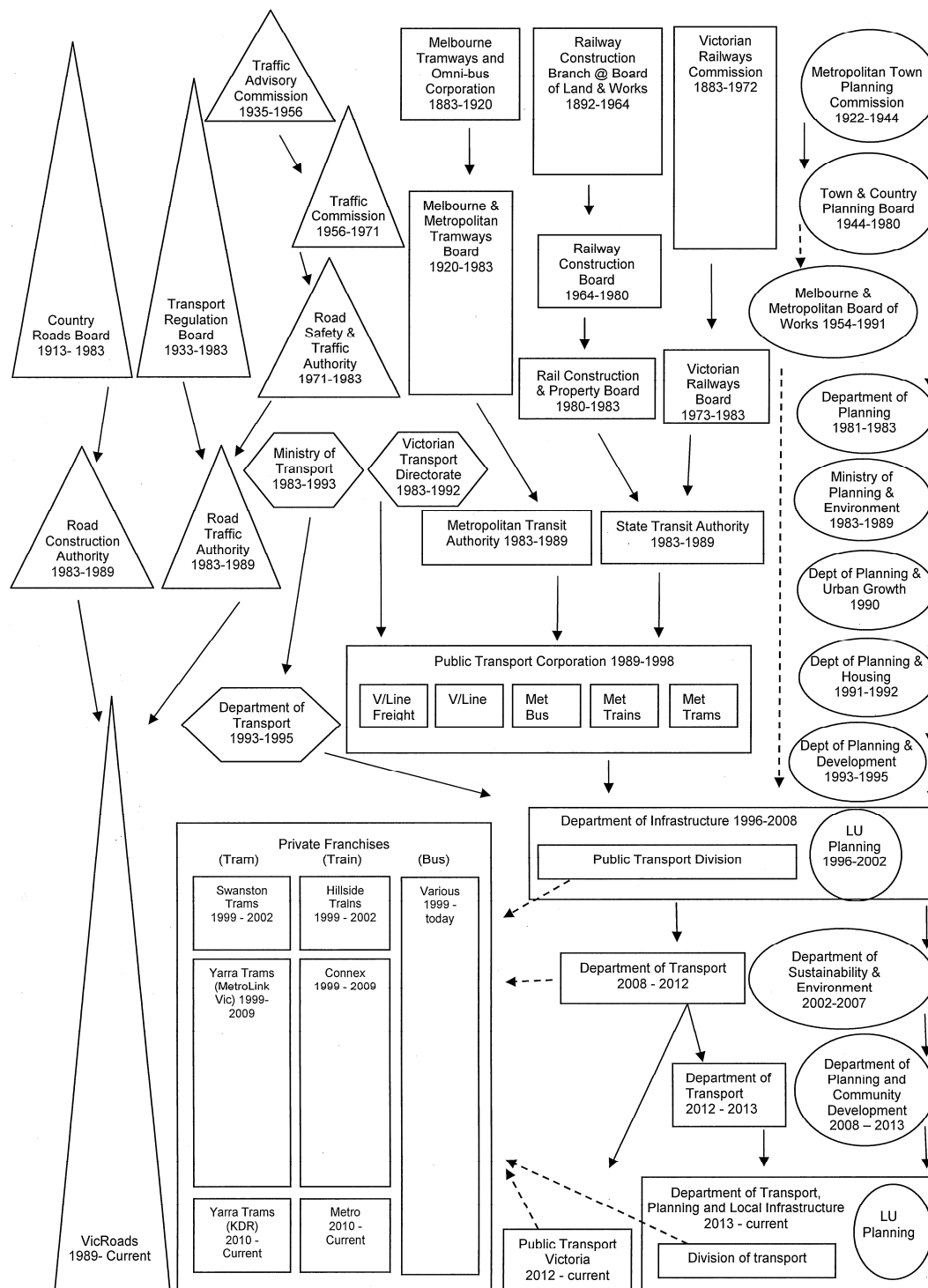
From a very early period in Victoria’s history, governance over road space allocation remained complex, informed by multiple and often competing statutory and private authorities. Figure 4.1 illustrates the chronological changes in authorities responsible for road space allocation. The figure is adopted and revised from Legacy, Curtis & Sturup (2012, p. 10), and is referred to throughout this chapter. Several conclusions can be more immediately drawn from Figure 4.1.

Aspects of the complexity concerning Victoria’s institutional landscape masked in Figure 4.1 include local government and stakeholder groups such as the Melbourne Chamber of Commerce and the RACV not being represented. Similarly, ministerial arrangements between state cabinet and respective state authorities, which have also gone through several phases of change, are not represented. Aspects revealed in Figure 4.1 include the most prominent point concerning continual restructuring to various government, semi-government and private authorities. Compared to continual disaggregation and re-aggregation of public transport and land use authorities, different road authorities have undergone significantly less alteration.

Issues related to organisational re-structuring are more pronounced when examining the creation of VicRoads in 1989. Since 1996, privatisation of Victoria’s train, bus and tram systems represents a significant departure when contrasted to how different authorities operated. Prior to 1996, there was a more direct and explicit line of sight between managing and determining policy with that of day-to-day operations. Since 1996, various private operators have been charged with daily operations, and different state agencies have been charged with determining policies. When viewed historically, issues generated from a multitude of single-purpose authorities all charged with different mandates at the turn of the 19th century, to some extent remains just as complex today with the combination of private and public authorities charged with different aspects of Melbourne’s mobility infrastructure.

Chapter 4 Governance of road space allocation

Figure 4.1: Chronological summary of governance for road space allocation



Chapter 4 Governance of road space allocation

Victorian municipalities and shires have never been given power by either the state or federal governments to operate public facilities, and have only occasionally been directly involved in public transport (Stone, 2008). The “massive primacy” of Australian capital cities, such as Melbourne, in “economic and demographic terms” ensured that state political issues were often dominated by “metropolitan matters” (McLoughlin, 1992, p. 117). By law, state legislation, plans and policies supersede council plans and policies—even capital cities. For example, the *1890 Local Government Act* stipulated widths should strive to be one chain wide (20.1 metres) (State of Victoria, 10 July 1890, Part XVI, Division 1, 392). Roads at widths less and more than one chain width have been constructed throughout Victoria. Thus, a direct cause (i.e. legislation) and effect (i.e. actual road width constructed) cannot be made. This underscores the complex nature of rules that govern road space allocation. Irrespective, the 1890 Act’s vagueness as to when councils could construct new roads was clarified in the *1903 Local Government Act* which provided the following two legal powers and stipulations:

Subject to the provisions of this Act, the council of every municipality may within the municipal district or with the consent of the Governor in Council in any part of Victoria from time to time open new streets or roads divert any street or road alter or increase the width of any street or road (State of Victoria, 24 December 1903, Part XIX, Division 2, 476(1))

No new street or road shall be opened by the council of any municipality so as to be less in any place than one chain width including footpaths without the consent of the Minister (State of Victoria, 24 December 1903, Part XIX, Division 2, 476(2))

Language contained in the 1903 Act that outlined the legal powers bestowed to local governments in Victoria was subsequently used in revised Local Government Acts of 1915 (Part XVIII, Division 2, 476(1) and (2)); 1929 (Part XIX, Division 2, 522(1) and (2)); and 1958 (Part XIX, Division 2, 523(1) and (2)). The language was not altered until the *1989 Local Government Act*, which deleted the requirements and stipulations.

Historians often cite the essential role that councils had in constructing and maintaining roads until early 1900 (Clark, 1989; Lay, 1984). Although this conclusion is not disputed, legislation ensured councils did not overpower their respective states. In contrast, in 1853 the Victorian government established a Central Roads Board with exclusive powers over main roads and smaller District Roads Boards for minor roads (State of Victoria, 8 February 1853). Both boards had the authority to levy tolls and rates (Holmes, 1976). The Central Roads Board lasted for only a short time with its powers eventually bestowed to the smaller Boards until 1869, after which the smaller

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Boards were abolished and replaced with municipal councils and rural shires (Anderson, 1994). By 1874 the function of Victorian councils and road construction and maintenance and public facilities were established and formalised (Holmes, 1976).

For the greater part of Victoria's history, the state has had two primary road authorities, the Melbourne and Metropolitan Board of Works (MMBW) established in 1891 (State of Victoria, 10 July 1890), and the Country Roads Board (CRB) established in 1912 (State of Victoria, 23 December 1912). The CRB was charged with construction and maintenance of middle and outer metropolitan roads; the MMBW was charged with construction and maintenance of roads in inner metropolitan area; and local councils/shires were charged with local roads (Pickett, 1973).

The introduction of the CRB provided Victoria with a single authority charged with managing, constructing and declaring main roads. After the 1912 Act, local governments were not required to financially contribute to state declared roads. The CRB was provided with two sources of funds (Lay, 2003, p. 48). Road maintenance and administration were financed from vehicle registration fees, licensing drivers and traffic fines. Road construction was funded from state funds. The CRB met almost half of its construction and maintenance costs, with local governments making up the difference—councils had no option but to participate. CRB was created for a variety of reasons; pertinent here was a belief within state government that metropolitan “traffic” needs were beyond a local government’s parochial interests (Lay, 2003, p. 47).

Roads deemed by the CRB to be of significance were based on an existing or a future road’s traffic carrying capacity and its potential to seed development (Lay, 2003). Criteria used by CRB staff to declare a road was vague. Initially, criteria was based on “the opinion of the Board” as to whether a road was “of sufficient importance to be declared a State highway” (State of Victoria, 23 December 1912, Part 1, Section 21). The CRB could equally rescind a road’s declared status if the Board perceived it no longer reflected “sufficient importance” to be considered a State highway.

Therefore, early governance over road space allocation were largely informed by the crude terms of declared and un-declared road space. This distinction remains largely unchanged in contemporary Victoria. Problems derived from different road classifications remained contested for 70 years until the *2004 Road Management Act* sought to directly rectify the topic.

4.2.2 How politics shapes governance

Rules governing road space allocation are deeply impacted by changing political climates. Though politics has long been identified as a core aspect of planning more generally, this chapter reveals that in the case of Victoria, accounting for politics is crucial when examining road space allocation. For example, the *1922 Public Works Act* and *1926 Federal Aid Roads Act* signalled the Australian Commonwealth becoming involved in road funding (Lay, 2003). Since the Country Party, now the National Party, traditionally held transport portfolios at both Commonwealth and state levels, funding formulas favoured rural roads (Neutze, 1978). Urban councils such as Melbourne City Council therefore received significantly less funds compared to their rural counterparts (Davison & Yelland, 2004). Robert Menzies' campaign speech in Melbourne on November 10, 1949 is generally cited as the point when car ownership in Australia took off in earnest. Menzies' promise to end war time petrol rationing built on "emerging ideals of individual freedom and prosperity" (Davison & Yelland, 2004, pp. 111-112).

Politically-infused instances such as the promise to end war time petrol rationing indicate how governance can be altered extensively and quickly. For instance, the Menzies government marked a significant intersection when state and Commonwealth governments sought to formalise a national set of road rules (NTC, 2011). Comprised of Commonwealth and state road ministers, the Australian Transport Advisory Council was created in 1947 to assist in creating a formalised set of road rules for Australia. The first national traffic code issued in 1958 received a mixed reception; "some jurisdictions adopted parts of the code with enthusiasm, while others ignored significant parts of it" (NTC, 2011, p. 5). The initial rejection by local and state authorities reflected competing viewpoints as to what constituted a fact, as facts remained context-geographically specific (i.e. what is appropriate for one council or geographical area may be deemed inappropriate for another). For example, differences in regulation could be seen between states and within states. In Victoria, councils often regulated traffic differently within their respective jurisdictions (See Chapter 5 for more detail).

Irrespective of politics, by the mid-1950s, governance of the state's wider infrastructure network was convoluted; "railways, trams, buses, power, gas, education, housing, hospitals, harbours and industrial promotion all studied their independent crystal balls and planned their works ahead into the different metropolitan futures they saw there" (Stretton, 1970, p. 200). Each authority had their own agenda which they implemented according to their respective organisational conventions.

4.2.3 Recurring themes in governance

Two important historical points to understanding governance found in Melbourne is the state's approach to car congestion and the passing of the *1983 Transport Act*.

Beginning around the mid-1950s, the state began a two prong approach to resolving road congestion, implementing road measures to provide greater priority for motorised travel modes and constructing new roads. This two program approach was defined in Chapter 1 as the dominant car paradigm driving contemporary transport planning.

Under the Premiership of Lindsay Thompson (1981-1982), the state began the process of altering Victoria's wider planning institutional landscape, which was more fully implemented under the ALP government in 1982, with the passing of the *1983 Transport Act*, under the Labor Premier John Cain, and subsequently Victoria's only female Premier Joan Kirner. Post the *1983 Transport Act*, changes in organisational name, structure and responsibility, often followed changes in state government. Organisational restructuring did not always result (though it did in many cases) in significant alteration to key staff (organisational restructuring is taken up in more detail in Chapter 7).

Henry Bolte's long tenure as the Victorian Premier from 1955 to 1972 oversaw several crucial road space allocation controversies, identified later in the chapter, such as the beginning of Melbourne's freeway network. The ensuing battles and general upheaval generated from the freeway boom has been examined from Australian (Davison, 2000; Davison & Yelland, 2004) and North American (Mohl, 2004) perspectives. As we saw in Chapter 1, the freeway boom also helped to create two very different Melbournes.

The 1972 election of Rupert Hamer as Premier ushered in a change from a conservative rural persona to a more environmentally friendly urban persona and ideology more aligned with growing environmental awareness, without a change in the ruling party (Davison & Yelland, 2004; Stone, 2008). The Victorian election was followed a few months later by the Commonwealth election of Gough Whitlam who brought greater focus to urban issues such as freeway construction.

The election of John Cain Jr. in 1982 marked another transitional point in governance over road space allocation. Cain provided Victoria with its first Labor Premier since 1955, ending almost 30 years of a Liberal state government under Henry Bolte (1955-1972), Rupert Hamer (1972-1981) and Lindsay Thompson (1981-1982). The agenda set by the Labor government has been acknowledged as an important point in

Victoria's larger history of planning (Dingle & Rasmussen, 1991; Gleeson & Low, 2000). The ALP government remained greatly informed by the freeway plans outlined in the 1954 *Planning Scheme* and the 1969 *Melbourne Transportation Study* (Mees, 2000; Stone, 2008). Large public demonstrations over inner-urban freeway construction continued under the Cain government (Davison & Yelland, 2004). Aside from the anti-freeway demonstrations, the state was in the middle of a major recession, and the Labor party had campaigned on the slogan "to run the state like a business" and to do more with less (Dingle & Rasmussen, 1991, p. 362). It was from this background that the 1983 *Transport Act* was introduced.

During the second reading of the 1983 Act, Minister Steve Crabb stated that the proposed corporate approach advanced by the Cain government would "ensure more broadly based decisions, with better co-ordination and utilisation of resources" (Victorian Parliament, 5 May 1983, p. 4323). The reference to greater state control was supported with the creation of the Victorian Transport Directorate and increased oversight by a stronger Ministry of Transport. The corporate approach borrowed heavily from similar ideas advocated in the UK in relation to local government (Logan, 1981).

Returning to Figure 4.1, in addition to creating a stronger Ministry of Transport, the 1983 Act abolished all road and public transport authorities, and created four new authorities: the Road Construction Authority (RCA) and Road Traffic Authority (RTA), and two public transport authorities, the Metropolitan Transit Authority (MTA) ('the Met') and the State Transport Authority (STA). The RCA was charged with constructing new roads and freeways and the RTA with managing existing roads. The governing purview of RTA and MTA remained in established inner-urban Melbourne. A key function of the RCA (subject to agreement with the RTA) was to "purchase, design, construct, erect, install, maintain and operate traffic signals/other traffic facilities for the purposes of traffic management and control" (State of Victoria, 23 June 1983, Part II, Section 20(1)). The function accorded with RTA's function to develop and implement traffic management strategies (State of Victoria, 23 June 1983, Part II, Section 18(1)).

In contrast, the public transport authorities of the MTA and STA were charged with more conflicting duties. For instance, the MTA was to give regard to improving transit journey times when exercising its duties, by promoting and implementing schemes allocating traffic priority to on-street public transport services (State of Victoria, 23 June 1983, Part II, Section 16(3)). Additional powers were given to both the STA and MTA related to the opening, breaking up and diverting of traffic from any street (schedule 3).

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Importantly, MoT maintained control over the MTA, with train and tram management and union representatives working together in developing policy (Stone, 2008). The administrative purview for non-declared roads remained with both the STA and MTA and declared main/major roads remained with both the RCA and RTA.

Returning to Figure 4.1, The *1989 Transport (Amendment) Act* five years on continued the trend in state government to streamline state authorities (State of Victoria, 6 June 1989). The 1989 Act created two new corporatised authorities: The Roads Corporation (VicRoads) and the Public Transport Corporation (PTC). On 1 July 1989, the MTA and STA merged to form the PTC, and the RCA and RTA merged to form VicRoads. From 1989 through 1996, transport planning, operation and management remained within the two corporate entities: VicRoads was charged with all things road-related and PTC was charged with all things public transit-related.

VicRoads took over RTA's central function of developing and implementing traffic management strategies and practices, as well as RCA's function related to designing, maintaining and operating traffic signals for the purpose of traffic management and control (State of Victoria, 23 June 1983, Part II, Section 16(1)). VicRoads was to give regard to improving the state's principal road network when exercising its duties, in order to facilitate the efficient vehicular movement of people and goods (State of Victoria, 23 June 1983, Part II, Section 16(1)). VicRoads staff have continued to review road classifications to help clarify governing responsibility (VicRoads, 1990, p. 25).

The election of Jeff Kennett as Premier in 1992 again restructured Victoria's transport planning institutional landscape. Under a neo-liberal ideological lens, the Kennett government's approach in all facets of planning in Victoria shifted to infrastructure (Gleeson & Low, 2000). For example, the infrastructure focus was stressed by the organisational name bestowed to the state's newly unified transport and land use planning authority: *Department of Infrastructure* (Low, Gleeson, & Rush, 2003, pp. 97-98). Although VicRoads independence, responsibilities and policy ambit have largely remained unchanged, the authority's objectives were reshaped towards emphasising infrastructure-related improvement, maintenance and allocation.

Returning to Figure 4.1, under the Kennett government, aside from VicRoads, planning and transport authorities were again restructured. Road, public transport and water were "pruned and corporatised" and 55 local councils were reduced to 31, their power curtailed and their services "compulsorily let out to tender" (Davison & Yelland, 2004, p. 241). Privatisation was modelled on Thatcher's 1980s UK administration. Discussion

on privatising Victoria's public transport services have been well documented (Barber, 2010; Kain, 2007; Mees, 2000; Stone, 2008).

The unexpected election of the Bracks Labor government late in 1999 ushered in a new political landscape, and left Labor largely unprepared to run government (Mees, 2003). The state government began work on developing the metropolitan-wide planning document *Melbourne 2030* (DoI, 2002). Intended to consolidate a more sustainable vision of development in Victoria to 2030, the document outlined strategies such as urban development consolidation and transit cities to facilitate greater public transport ridership (DoI, 2002). However, post-implementation analysis of *Melbourne 2030* has documented issues with convoluted terminology, poor implementation, and unrealised public participation (Birrell, O'Connor, Rapson, & Healy, 2005; Kroen & Goodman, 2012; Mees, 2003). *Melbourne 2030* mirrored other subtle changes occurring in different state authorities. This was later punctuated with the passing of the *2004 Road Management Act* and *2010 Integrated Transport Act*.

The 2010 Act sought to accomplish a similar overhaul of Victoria's transport legislation that had occurred under the *1983 Transport Act*. When the *1983 Transport Act* was introduced it "constituted the largest overhaul of transport services management in the history of Victoria, initially repealing over 200 pre-existing Acts" (Victorian Government, 2009, p. 3). The passing of the 2010 Act culminated in over five years of consultation, public forums and interviews with professionals and scholars (Victorian Government, 2009). Although caution is required in extending the analogy, in many ways the 2010 Act reflected a similar realisation by different authorities of the impossible nature of building Melbourne out of congestion found in the 'new realism' literature (see Chapter 2). The 2010 Act also created the new statutory authority, the Public Transport Victoria (PTV). The PTV was only actualised in March 2012, so its place within Victoria's transport planning institutional landscape has yet to unfold.

The 2010 Act sought to create a legislative framework capable of addressing criticisms cited in government reports (Barber, 2010; SSA, 2008; VAG, 2011; VCEC, 2006). For example, a 2008 State Service Authority (SSA) report took direct aim at governance of the state's two primary transport authorities, VicRoads and DOT (SSA, 2008). The SSA report found evidence that although the relationship between the two authorities had improved, such improvement relied on the goodwill of senior decision makers within each agency, not formally articulated or established across organisational conventions (SSA, 2008, p. ix). The following year, many of the SSA report's findings were

implemented. For example, VicRoads line of communication was moved under the DOT's Secretary of Transport to provide an unimpeded line of communication to both the Minister for Roads and Ports and Minister for Public Transport.

4.3 Chapter summary

This chapter has shown that governance around road space allocation has changed very little over the past century. In general terms, state legislation, plans and policies supersede all council plans and policies—even capital cities like Melbourne. Evidence presented in this chapter indicates that politics and legislatively mandated responsibilities have a powerful impact on road space allocation. With respect to understanding the rules that inform how road space allocation is governed, several important findings can be made.

First, state road authorities have a dominate role in road space allocation. The dominance is supported, stabilised and entrenched by the to two crude road classifications; declared and un-declared road space. Chapter 2 revealed a growing reliance on road classifications to help transport planners resolve the liveability tension. As this chapter has revealed, road classifications also play a crucial role in setting out the governance of road space allocation. In Victoria, the relationship between road classifications and governance is reinforced at the legislative level. Subsequent iterations in the *1983 Transport Act*, *2004 Road Management Act* and *2010 Integrated Transport Act* have only partially rectified issues stemming from road classifications informing declared and non-declared road space. Since the 1920s, criteria applied in declaring a road has grown to include aspects such as roads with tramlines. Over time negotiations and legislative additions resulted in a declared road network found in Melbourne today that includes roads with and without trams lines. This sets the scene for future conflicts over how to allocate road space. As we see in subsequent chapters, aspects of governance delineate the boundaries of policy discussion, but alone remain are insufficient for understanding how road space allocation tensions are resolved.

Second, stable institutional structures guided by car-oriented ways of governing provide some insight for understanding how road space allocation elements intersect. Yet, given the objective of this chapter was to specifically identify and examine the rules governing road space allocation, making any specific claims at this point is not appropriate. For example, questions remains regarding to what extent professional knowledge held by transport planners clashed with the rules and organisational

conventions? Answering this question involves analysing how the constitutive elements of road space allocation intersect, which is taken up in subsequent chapters.

With respect to understanding the rules that inform how road space allocation is governed, we can make one more statement in relation to the dominance of state road authorities. As the current state road authority, VicRoads' dominance in road space allocation can be expanded. First, even today VicRoads is responsible for declaring, and subsequently allocating space on declared roads, and local governments manage and allocate space non-declared road space. This again reflects the first point made above. Secondly, it remains a single-purpose dominant authority critical to allocating road space in Melbourne. This has been achieved by creating a stable, persistent and entrenched presence at the institutional level, capable of weathering Victoria's volatile political landscape described in this chapter. For example, Table 4.1 presents an analysis of the organisational structure diagrams for VicRoads and the PTC (1989–1998), when both were operational.

Table 4.1: Summary of VicRoads and PTC executive staff, 1989–1998

	VicRoads	PTC
1. Number of individuals on all 9 organisation charts from 1989 to 1998	4	1
Number of individuals in (1) that become CEO of either organisation	2	0
2. Number of individuals responsible for road space allocation on at least 5 of the 9 charts	2	1
3. Number of individuals found on 2011 (VicRoads, PTV, DOT) organisational chart that appeared on at least one chart between 1989 and 1998	4	1
4. Number of individuals in (3) that are currently CEO of either VicRoads, PTV or DOT	1	1
5. Number of individuals in (3) responsible for road space allocation during the 2009-11 period	3	0

We can see that VicRoads has maintained a level of permanence as an organisation since its creation in 1989—an impressive point when contrasted with the PTC dissolving five years after its creation in 1998. VicRoads has successfully retained key personnel, shifting them across and upwards within different divisions until reaching senior positions.⁴ The PTC did not share this ability.⁵ From a strict senior decision-making standpoint, this has resulted in a road authority capable of weathering Victoria's volatile political landscape.

⁴ VicRoads annual reports (1993, 1994b, 1995b, 1996b, 1997, 1998b, 1999, 2000, 2001, 2002b, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010b, 2011).

⁵ Public Transport Corporation annual reports (1991, 1992, 1993, 1994, 1995, 1996, 1997).

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Since the early 1980s, Victoria's institutional planning landscape has continued to expand and contract—a trend that has remained stable and largely based on travel modes. Thus, roads have remained with one authority, public transport planning with another, and land use planning with yet another authority. This arrangement has remained in effect since the turn of the 20th century. To some extent, VicRoads mandate as well as its dominance in road space allocation reflects an idealised institutional model of transport planning often cited in scholarly studies (Kennedy, Miller, Shalaby, Maclean, & Coleman, 2005). Specifically, it remains a single organisation with the necessary powers, skills and responsibilities critical to engage metropolitan road space allocation tensions (i.e. network). However, evidence presented in this chapter supports other findings that VicRoads inherited its predecessor's governance and organisational conventions (Mees, 2000; Stone, 2008). Thus, VicRoads remains the state's primary road construction and management authority, not the primary multi-modal transport infrastructure authority. This sheds light into how stable institutional structures guided by car-oriented ways of governing, help support similarly stable divisions of professional competencies, values and field of responsibility. Understanding this point further requires examining in more detail how all four constitutive elements of road space allocation intersect and which is therefore the focus of the next chapter.

Chapter 5 – Exploring contests over use of road space

This chapter explores professional norms and conventions that facilitate and constrain road space allocation in Melbourne, Australia. This is second of the four key objectives outlined in Chapter 1. Specifically, this chapter examines how organisational conventions help constrain and resolve conflicts generated from increasing on-street car parking needs. Material for this chapter is drawn from a variety of sources that include Brown-May (1998), Clapton (2005) and Davison (1981, 2000; 2004), as well as original archival material such as government policy documents, public submissions, newspaper articles and parliamentary documents.

We begin by exploring early road space allocation controversies prior to the arrival of the car in Melbourne. This sets the stage for understanding resolution to the spatial tension, the first of four road space allocation tensions identified in Chapter 2. The spatial tension highlights the obduracy of road space itself, or the ‘what’ of road space allocation. In the context of road space allocation it is critical to understand the ways in which a road’s material contours of agency come to shape and determine the actions and decisions of transport engaging in the everyday professional practices. Once a road is constructed, or a tram network put into place, the space is largely set. Thus, re-allocating road space to give priority for bicycles or trams, or leaving such space for parked cars, inform how transport planners determine how and for whom, road space is allocated. Consequently, determining whether road space is viewed as a theatre for humans, a mobility conduit, or a car parking lot, involves knowledgeable actors actively engaging with, reacting to and/or against, the road space in question being allocated.

As made clear in this chapter, this path is deeply shaped by professional norms and conventions that facilitate and constrain road space allocation. After exploring early road space allocation controversies prior to the car’s arrival, we shift to examining on-street car parking controversies, and conclude by analysing the most recent clearway controversy. As we see, on-street car parking has remained a long and contested issue in Melbourne. Interestingly, car parking remains a peripheral topic of critical scholarly inquiry. Although every car requires a place to begin and end a journey, 95% of the time cars remain parked (Vanderbilt, 2008). Donald Shoup’s investigations into the topic include a large and compelling body of evidence as to the vague and questionable policies and practices of car parking (Shoup, 1997, 2005; Shoup & Pickrell, 1978).

Car parking problems were acknowledged early on in Melbourne. Resolving on-street car parking controversies required transport planners draw from existing knowledge and organisational conventions at the time. Thus, learning the pitfalls to parking was something both government and the general public learnt together, in real time. As argued in Chapter 2, examining road space allocation in real time helps account for how agency is constituted and/or constrained. As revealed in this chapter, governance established the rules of the game, but not for how the game was played. Transport planners and organisational conventions responded to changing cultural norms around mobility. The path was not linear, but it reflected a slow, meandering path of conflict and debate. Thus, changes in transport planning knowledge and conventions co-evolved with the car's normalisation in Melbourne.

5.1 Pre-motor car resolution of the spatial tension

From the late 1880s to the 1930s, the City of Melbourne became the economic, social and cultural hub of activity for Victoria. In turn, road space allocation controversies were confined primarily to the city boundaries of Melbourne. Contests over road space were the result of attempts by the Melbourne City Council (MCC), business community and general public to reconcile the right to use road space at various times during the day for different reasons, and the right to travel on road space in different modes and at different speeds (Brown-May, 1998). Thus, if one walked into the heart of Melbourne from the late 1880s to 1930s, they would have encountered an eclectic and chaotic mix of trams, horse-drawn carriages, horses, bicycles and pedestrians. Roads were rudimentarily paved, and aside from tram tracks, there were no road markings. Subsequently, engaging mobility challenges remained deeply informed by Melbourne's early built fabric. However, the introduction of technology, such as road pavements, and travel modes, such as the bicycle, shaped organisational conventions around road space allocation in two ways.

The first was that new technology was understood from the perspective of existing organisational conventions and transport planning competencies, skills and norms. This implication had two further follow-on effects: 1. road space was altered from the primary site for public use to mobility, and 2. the development of a pre-formal transport planning record of competencies, skills, norms and processes. The wider outcome of this implication and follow-on effects was that road space was defined, organised, arranged, separated, segregated and relatively clean and orderly, well before the car was introduced to Melbourne's road space.

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Horses were crucial to Melbourne's economy up to the 1930s. Most Victorians directly or indirectly relied on horses for daily travel and employment (Anderson, 1994). A horse-dependent economy subsequently generated intense manure and urine smells that emanated from stables and roads, and which required daily removal (Anderson, 1994; Brown-May, 1998). MCC staff incorporated nascent knowledge from scientific and health discoveries to interpret road space allocation. Health (i.e. horse and human faecal matter) and safety (i.e. runaway horse) concerns eventually merged with economic interests championed by local businesses. The unintended or perhaps intended consequence of removing horse manure and other debris resulted in more ordered and segregated road space (Brown-May, 1998; Sennett, 1994).

Governance summarised in Chapter 4 ensured that MCC's purvey was confined to their jurisdictional boundaries. However, council by-laws slowly altered road space as the primary site for public events and activities. By-laws also provided transport planners, government and public and private authorities with a record of terms, concepts, statistics and processes that formed the foundation of organisational conventions. MCC increasingly employed by-laws to regulate road space on behalf of land developers and the business community (State of Victoria, 10 July 1890). In turn, MCC by-laws began to curtail loitering on city footpaths and regulate time and place of street vendors (Brown-May, 1998). Early conflicts, debates and subsequent regulations over footpaths foreshadowed later struggles over kerbside car parking and clearways. Importantly, a continuous string of MCC by-laws helped define terms such as pedestrian, travel, loitering, footpaths and streets (Brown-May, 1998). Consequently, in addition to looking to practice and regulation elsewhere (i.e. London), MCC by-laws provided an important avenue to create a body of professional terms and organisational conventions to engage road space allocation.

Organisational conventions during this period were also shaped by engaging new technologies. Engaging technology had two follow-on effects: 1. the need to look outside of Melbourne for guidance, and 2. relying on dominant existing technologies and travel modes to base decisions. The wider outcome of this implication and follow-on effects was that previously un-encountered issues and technologies were engaged with pre-existing professional norms and organisational conventions, irrespective of compatibility or appropriateness.

As Australia's first city, Sydney was often the first port of call for guidance into engaging new technologies, but professionals also looked overseas towards Britain,

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and increasingly towards North America. The wider transport planning profession was in its infancy. Transport planners principally included city officials and civil servants, traffic police, private transport business owners, and professional disciplines such as architecture, engineering and town surveying. In turn, both transport planning and organisational conventions were literally being developed during this early period.

Transport planners therefore reacted to new technologies, such as the bicycle, based on pre-existing professional norms and organisational conventions. For example, standardisation of public transport timetables had a powerful influence on daily urban life (see Chapter 2). As the economic hub of Victoria, omnibuses (an early form of taxis) began to congest Melbourne's roads. In 1850 the state empowered MCC to license and regulate omnibuses (State of Victoria, 19 July 1850). Initially, omnibuses operated "according to a sketchy timetable", which in turn resulted in carriages remaining parked until they were full (Davison, 1993, p. 60). From an omnibus operator's perspective remaining stationary until the carriage was a full maximised profit. By the early 1860s, Melbourne's roads were filled with parked omnibuses (Figure 5.1)⁶. The issue was resolved by employing an individual to remain stationed outside with a stopwatch to ensure omnibus drivers obeyed maximum standing times (Davison, 1993). Given technology, transport planning norms and organisational conventions at the time, the solution was perfectly reasonable. Such instances legitimised public transport timetables, and further advanced the notion that road space was the primary site for travel. A decade later, where omnibuses could park (centre and/or kerbside), fares and routes were all regulated (MCC, 22 July 1861).

Figure 5.1: 1862 Bourke Street, courtesy of Patsy Smith



⁶ Figure 5.1 from Smith (1979, picture 87).

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Criteria such as speed and size often only partly informed professional decisions and regulations. Human perception scripted how different actors understood and engaged with road space (see Chapter subsection 2.1.2 for more detailed discussion). In turn, transport planning and organisational conventions were deeply informed by personal firsthand interaction with road space and technology.

Up until the late 1890s, the bicycle provided one of the fastest means of travel in Melbourne (Brown-May, 1998). The earliest bicycle recorded was in 1846 (Anderson, 1994). The small silent and highly manoeuvrable vehicle required several years before Melburnians became comfortable with the machine (Clapton, 2005, pp. 199-200). The bicycle created new issues that required MCC clerks and bureaucrats to develop new regulations. For instance, when a cyclist ran into a pedestrian walking along a pathway in December 1876, the “police were unsure of the rule of the road as it applied to bicycles” (Brown-May, 1998, p. 37). The bicycle’s place on Melbourne’s roads was eventually resolved through MCC by-laws. By-Law No. 103, *A By-Law for the Regulation and Government of Drivers of Bicycles, Tricycles, and other Velocipedes* (MCC, 23 August 1897), outlined several regulations for riding a bicycle, such as requiring the bicyclist to carry a lamp when riding between the hours of sunset and sunrise, and requiring the bicyclist to dismount when encountering a horse and rider, where the horse had become alarmed by the bicycle. In relation to organisational conventions, the by-law reflected two points. The first related to the horse’s dominance in Melbourne’s larger economy and as the primary mode of travel. The second point related to the circumstance of the travel mode in question. Whereas a car or bicycle cannot become alarmed, a horse can.

To summarise, the introduction of technology and travel modes shaped organisational conventions around road space allocation in two ways. The first was that road space was defined, segregated and relatively orderly, well before the car’s introduction to Melbourne. The second way was that previously un-encountered issues were reacted to and against by application of pre-existing professional knowledge and skills and organisational conventions, irrespective of appropriateness. Subsequently, resolution of the spatial tension during this pre-car period in Melbourne’s history was deeply impacted by how professionals as well as the general public understood and engaged infrastructure and technology of the time period. This point can be further understood by examining how competing and often divergent organisational conventions held by private public transport operators, helped resolve the spatial tension.

Melbourne's train, tram and bus transport systems each began as separate private business undertakings (Mees, 1997). Similar to MCC staff, statutory tram operator staff relied on firsthand accounts of Melbourne's road space to make decisions. In contrast with MCC staff, decisions were based on business concerns similar to those of omnibus operators. The intent was not to unify train, tram and bus routes, but to increase revenue. Tram statutory corporations had no qualms about syphoning passengers from omnibuses and trains.

The statutory corporation, Melbourne Tramway and Omnibus Company (MTOC) was created in 1883 (State of Victoria, 12 October 1883). By law, MTOC was obligated to run morning and evening trams to accommodate working-class commuters. Yet, from the very beginning, the company's pattern to construct tramlines to the outer suburbs indicated a strong desire to reach a higher-class of clientele, even though the majority of inner-urban tramlines were severely overloaded with workers during peak morning and evening periods (Davison, 1981). MTOC's 30-year monopoly franchise over Melbourne's entire cable tram network ended in 1916. The *1918 Melbourne and Metropolitan Tramways Act* handed operation over to the statutory corporation, the Melbourne and Metropolitan Tramways Board (MMTB).

MMTB's corporate board reported directly to the Minister of Public Works until 1952 (subsequently to the Minister of Transport under 1951 Transport Act); bestowing it with a great deal of power. Its independence shaped road space allocation in several ways. Under chairman Robert Risson, the MMTB successfully and vigorously lobbied the state government for improved tram priority (Cole, 1996; Turnbull, 2002). Risson was central to getting the MCC to pass by-laws providing greater tram priority (Cole, 1996). The MMTB also successfully electrified the majority of Melbourne's cable tram network. Accomplishing this immense task required extensive and disruptive construction for most of the 1920s. The electrification of the tram network provided a unique and perhaps unintended opportunity in Melbourne's history that reinforced the material importance of trams. Historians contend there isn't one specific reason for why Melbourne kept its trams (see Chapter 3). What is clear is that the organisational conventions of tramway boards ensured trams continually re-asserted their presence on Melbourne's road space. This resulted in the electrification of all tram tracks—the timing of which not only rejuvenated the tram infrastructure, but coincided with the exact point when Australia hit the depression and when international cities were systematically removing their respective tram networks.

In way of summary, as late as the 1920s, Melbourne's roads consisted of a mixture of pedestrians, bicycles, horses, trams and motorised vehicles, all intermingling (often in conflict), on road space with little, if any markings. Technology and artefacts such as the horse-drawn carriage, bicycle, tram and eventually the car, informed conventions and norms around road space allocation. To further examine how technology helped shape road space allocation, we turn our attention to the rise of a more professionalised transport planning discipline and introduction of the car.

5.2 *On-street car parking and the spatial tension*

This section covers Melbourne's history at the turn of the 20th century up to contemporary time. The car's introduction to roads initially built for trams, horse-drawn vehicles and pedestrians was contested from the beginning. Similar conflicts occurred in early urban cities found in North America (Norton, 2008), Britain (Moran, 2006) and Australia (Clapton, 2005). Engaging on-street car parking controversies did not occur in a linear fashion with cause and effect. Analysis indicates a long contested dialogue between state government, transport planning, business community and general public. As such, resolution of the liveability tension is best understood as emerging from the intersection of four constitutive elements of road space allocation.

5.2.1 *Melbourne City Council by-laws*

Given the tremendous amount of money, and personal energy involved with maintaining early cars, the car's arrival in most early industrialised cities, such as Melbourne, was initially a novelty item for the wealthy. The car resulted in new mobility patterns in contrast to replacement of existing patterns (Urry, 2004). Similar to the bicycle, the car also required a long adjustment period. For instance, it was not uncommon for stones to be thrown at motorists and drivers literally horse whipped by passing wagons (Simpson, 2004).

After failing to pass Victorian Parliament in 1905, a revised *1909 Motor Car Act* was enacted to assuage public concern over the car (Tranter, 2005). The 1909 Act was followed by Victoria's first driver's license issued on March 1, 1910 (Anderson, 1994). By 1924, roughly 90,000 cars, lorries and motorcycles were registered in Victoria, a dramatic increase, but still less than half of horse-pulled vehicles (Priestley, 1984). By the time Victoria followed other states in adopting uniformed road direction and danger signs in 1927 (Anderson, 1994), horse and non-horse vehicle numbers had evened out, with over 150,000 motor vehicles registered in Victoria (Laughton, 1928).

The primarily prescriptive *1909 Motor Car Act* established a driving age of 18 years, required cars to stop for accidents, mandated lights, bell or horn and required car registration to be displayed (State of Victoria, 4 January 1910). Although representing a vastly new technology, and despite emotionally charged parliamentary debates (Victorian Parliament, 14 October 1908, 23 August 1905), the 1909 Act introduced minimal restrictions to the car (Clapton, 2005; Manning, 1991; Tranter, 2005). In failing to account for or adjust to differences in speed, size or use, the car inherited pre-existing privileges of horse-drawn vehicles. Thus, organisational conventions and transport planning norms did not perceive the car to be very different to the horse.

Developing this consensus in relation to regulating the car often occurred through informal conferences. Such conferences therefore provided a valuable avenue in which to find agreement around professional norms and conventions that facilitate and constrain road space allocation. Melbourne hosted Australia's first national planning conference in May 1901 (Freestone, 2000). Whereas the 1901 conference largely used with an "idealistic new-century fervour" (Freestone, 2000, p. 27), a decade later a 1914 conference centred on more practical matters of the day, with conference attendants largely concerned with implementing the *1909 Motor Car Act*. "Motorists, police, public transport operators, state and local governments, public utilities, business organisations and trade unions all had a stake in public streets and roads" (Davison & Yelland, 2004, p. 135). Following the conference, MCC passed several by-laws aimed at regulating travel on city streets. An unusual regulation to emerge from the 1914 conference that remains today and is unique to Melbourne was the hook-turn (Brown-May, 1998). The hook-turn requires cars to execute a right-hand turn from the far left road lane at intersections containing a tram lane. As the car was largely a novelty item at the time, the tram reflected the primary mode of travel within Melbourne. Thus, the hook-turn was the product of organisational conventions and transport planning knowledge in place at the time.

The passing of the *1922 Metropolitan Town Planning Commission Act* by parliament 20 years later, followed international trends to professionalise the planning discipline (Freestone & Grubb, 1998; Sandercock, 1990). The 1922 Act created the Metropolitan Town Planning Commission (MTPC). The MTPC was given advisory status based on the North American tradition of developing a comprehensive metropolitan plan via a city planning commission (Freestone & Grubb, 1998). It was previously noted that the MTPC's 1929 *Plan for General Development* outlined one of the earliest international examples of a metropolitan-wide road system based on a hierarchy typology. Briefly

examining the MTPC's work also reveals thinking at the time in regards to the topic of car parking.

The 1929 *Plan* was supported by extensive surveys and studies, and contained an implementation strategy with detailed zoning and legislation requirements (Hutchings, 2000). Although collating their facts and conducting surveys investigations of Melbourne's own road space, knowledge applied by the MTPC to their work borrowed directly from North American traffic engineers. Instead of documenting an intimate record of the experiences and feelings of Melburnians, the MTPC divided up Melbourne's natural and built landscapes to study the metropolis with precision and control. For instance, calculating the most "economical use of road space" by comparing the occupied road space of a stationary motor compared with a standing passenger on a tram or bus (MTPC, 1925, p. 10; 1929, p. 54). As we have seen, this approach was driven principally by the view that road space was primarily for traffic. Yet, in relation to car parking, the MTPC stated that population increases and "encouragement given by the provision of extra facilities for street transportation will require more and more street space for moving vehicles" (MTPC, 1929, p. 56). The MTPC concluded that the best method for doing this was through "**progressive regulation, and the prohibition of the standing vehicle**" (MTPC, 1929, p. 56, bold in original). Yet, as discussed in Chapter 2, without any legal teeth and little support from municipalities, MTPC's work become overshadowed by the Great Depression.

The MTPC's views to car parking were to eventually reflect the minority view. Competing perspectives of industry, government, transport operators and the general public, continued to resemble a cacophony of perspectives towards how road space allocation issues should be engaged, and "not a unified voice" (Nichols, 2004, p. 52). Car owners believed they had the right to park on roads without government oversight; shopkeepers cited lost business due to motorists parking in front of their shop all day; and council officials argued their right to regulate traffic on their city streets. Similar to legislation, how transport planners began to manage on-street car parking drew heavily from prior knowledge and conventions with horse-drawn carriages. Between 1900 and 1930, MCC passed roughly 100 by-laws—almost half drafted during the 1920s, "most pertaining to issues of traffic" (Clapton, 2005, p. 130). By 1926 MCC was openly debating prohibiting kerbside parking (*The Age*, August 31, 1926a).

Resolution to competing perspectives around on-street car parking often occurred in court. An example of an early court case involved a dispute by a gentleman who

refused to pay 1 shilling to a MCC parking officer. MCC's By-law No. 190 became effective January 25 1928 (State of Victoria, 25 January 1928). The intent was to begin designating and controlling on-street car parking within the Melbourne CBD. By-law 190 contained an additional provision that provided council officers the capacity to collect a 1s per day parking fee. Fees were collected immediately, on the spot where the motorist parked their vehicle. In early March, the appropriately named Roy Shilling refused to pay the parking fee. Within the short time span from January to March, MCC's Town Clerk reported that irrespective of overhead costs associated with By-law 190, revenue raised from the 1s parking fee was substantial (Clapton, 2005, pp. 161-163). The gentleman's refusal to pay the fee therefore, inadvertently, provided MCC staff with an opportunity to prosecute, and in turn develop a legal record and further consolidate organisational conventions. The question of whether a car should be allowed to remain stationary on road space was not in dispute; but rather whether MCC had the legal right to charge motorists for such a privilege.

The dispute was resolved in the Victorian Supreme Court in mid-June (*Schilling v. City of Melbourne*, 1928). Clapton (2005, pp. 161-163) found that the court case caught MCC "with their pants down" when the judge determined that Council had extended their governing abilities of regulating traffic on their city roads. Although Council had the legal right to regulate their respective road space, including car parking, the Local Government Act in its current form did not afford MCC the capacity to raise revenue from such regulations "without direct Parliamentary sanction" (*Schilling v. City of Melbourne*, 1928, p. 308). The court ruling paved the way for the *An Act relating to Standing Places for Certain Classes of Motor Cars* (State of Victoria, 22 October 1928). The Act became integrated into the 1928 *Local Government Act* that vested all Victorian councils with the power to legislate the "standing places" of cars and charge a fee for doing so (State of Victoria, 12 February 1929a). Clapton's analysis of the court case concluded it increased the normalisation that "controlling motor car parking was an urban necessity", the result which transformed stationary cars into artefacts associated with Melbourne's expanding built mobility landscape (Clapton, 2005, pp. 163-164). This conclusion is accurate, but fails to distinguish other facets of the court case. Focusing on terms used in the case provides an additional perspective to that of Clapton that helps reveal how the spatial tension influenced the court case.

The Supreme Court judge focused specifically on the car's constitutive properties in relation to standing areas. The term 'standing areas' mirrored terms and characterisations of the time related to standing areas for horses and horse-drawn

carriages. The term was applied to the car; irrespective of whether horses stand and cars do not. Though both a horse and car remain stationary, only one is actually standing. To carry the analogy further, there is a marked spatial and affective difference in a human, animal, bicycle, horse-drawn or motor carriage remaining stationary on a road. The judge questioned whether “withdrawing” a car for an allotted period of time “from the stream of traffic” resulted in altering either the car or a road’s traffic stream flow. The judge acknowledged the demarcation was obscure, choosing to adopt the language used by another judge, stating that “vehicles do not cease to be elements of traffic when drawn up at the side of the street in the course of an ordinary and proper use of a highway” (*Schilling v. City of Melbourne*, 1928, p. 307). Based on this language and description, the judge decided that By-law No. 190 amounted to “setting apart certain portions of the streets to be used.... as places for storing vehicles when not engaged in street traffic” (*Schilling v. City of Melbourne*, 1928, p. 307).

The classification of storing identified by the Supreme Court judge reflected terms in use at the time, such as a garage or stable, reflecting artefacts such as horse-drawn carriages or commercial carts carrying wheat. The classifications alluded to a sense of permanence. The storing or stabling of motor carriages was found inappropriate by the judge in relation to a road’s obdurate permanence, or its condition as the primary site of the “stream of traffic”. In contrast, the classification of standing places alluded to the temporality of a stationary or non-stationary horse or motor carriage.

In relation to organisational conventions, the court case marked a change in the car’s classification. On the one hand, Clapton’s conclusion is correct: the case marked the material alteration and acceptance of stationary cars by transport planning and the wider public. On the other hand, the court case altered organisational conventions. Whereas the road’s centre was squarely in the realm of “stream of traffic”, other portions could be characterised as spaces for paid storage. Yet, in relation to resolution of the spatial tension, nothing had changed. Yet, the material contours of roads and trams networks continued to constrain resolution of on-street parking issues.

Parliamentary debates concerning the 1928 Local Government Act that followed the Supreme Court case focused heavily on the chaos of parked cars and potential parking fees. For instance, Mr Gray (St Kilda) agreed that councils should be given the ability to regulate and control car parking, albeit he had reservations about charging a fee. Divided “only by imaginary lines”, Mr Gray remarked that a motorist parking in one of 26 council municipalities might face yet another fee if the motorist decided to park in

another municipality (Victorian Parliament, 19 September 1928, p. 1746). Mr Hayes (Melbourne) was more emphatic in his discussion, declaring the road was the “property of the people”, and thus ill-suited to provide the parking needs of private motorists. He concluded cars had no business driving through the city, and that urban roads “should be set aside for trams” (Victorian Parliament, 19 September 1928, p. 1748). Importantly, parliamentary debate accorded with the Supreme Court case, leaving the notion that a road’s “ordinary and proper use” was for mobility unquestioned.

The introduction of car parking fees (*The Age*, February 25, 1931) and banning angle-parking were just two related motor parking topics that spurned the state Supreme court case. Such issues found some resolution with the passing of the 1928 Local Government Act (State of Victoria, 12 February 1929a). The 1928 Act was the product of over 10 years of public debate over the car’s role in urban society, particularly in relation to stationary trams, speed, congestion and parking provision⁷. Whereas the 1928 Act expanded local government’s regulatory capabilities over the car, the state government continued to question councils’ engagement at the metropolitan level. This alludes to issues stemming from the network tension with respect to conflicting needs and priorities of road space allocation at local and metropolitan levels (taken up in more detail in Chapter 8). The *Argus* quotes then Chief Secretary Mr. Macfarlan, who acknowledged councils should retain control of traffic in their jurisdiction.

[B]ut if the municipalities cannot agree upon some uniformity in traffic by-laws the Ministry will be compelled, unwillingly, to ask Parliament to alter the system of traffic control in the metropolitan area to ensure uniformity where that is practicable (*The Argus*, October 30, 1934).

Mr. Macfarlan described a point in Victoria’s history where the state government began to conclude that road space allocation at the metropolitan level was too important a task to be delegated to local government. Yet, such growing sentiments still had to face the same obdurate road space that prior professionals and governments faced prior to the car’s arrival in Melbourne. As such, resolution of the spatial tension soon came to be resolved through further differentiating which road space would fall under which government’s jurisdiction. For example, police Chief Commissioner General Blamey forwarded a proposal to Parliament in April 1933 advocating that traffic control

⁷ Examples of newspaper articles as well as letters to the editor include: (Laing, June 1, 1912; Letter to Editor, June 28, 1921; Riddell, March 4, 1924; *The Age*, August 31, 1926b; *The Argus*, February 19, 1913, June 11, 1914, October 18, 1918).

and regulation be removed from municipal control and vested with state police (MCC, 1934, p. 16). The Municipal Association of Victoria (MAV) had deep concerns over Blamey's proposal and brought the issue to a special Victorian Legislative Committee for review on June 13, 1933. A representative from all Victorian councils was present, with the general mood reflecting a position that transferring regulatory control of road space to the police was "was too autocratic a step" (MCC, 1934, p. 16). During a second MAV sub-committee meeting, recommendations were drafted that called for a special board to be created to oversee all traffic control matters in Victoria. The recommendations did not pass unanimously, but were carried by the majority.

The apprehensiveness demonstrated by local governments rested directly on *uniform* traffic regulations. At the time, councils often regulated traffic differently within their respective jurisdictions. The state's aim in standardising traffic regulations was to reduce motorists' confusion when driving in different council areas. From a local government perspective, the state "grossly exaggerated" the problem and argued that uniform regulations would still encounter "local conditions and circumstances" (MCC, 1935, pp. 11-12). *Local condition and circumstances* underscored professional transport planning competencies and norms. Whereas council officers engaged the spatial tension within their respective jurisdictions, the state was beginning to engage the spatial tension from a wider metropolitan perspective.

Just as in the Commission's 1929 *Plan*, transport planners in Melbourne continued to choose North America over Britain as the primary source of knowledge to aid in allocating road space from a metropolitan perspective (Bell & Bell, 1993; Rolfe, 1998). Publications such as *The American City* and the *Municipal Journal and Engineer* were crucial to emergent professions in North America and Australia (see Chapter 2). For example, Bartholomew's (1924, pp. 474-475) *Relation of Roadway Widths and Transit Lines to Street Traffic*, spoke to how streetcars hindered the "free flow" of car travel, and how cars interfered with streetcars. As the article's title suggested, resolution of the spatial tension required ensuring that "all roadways for modern traffic" have widths "based upon the number of lines of traffic to be accommodated" (p. 474). This underscored the growing adoption and dominance of the predict-and-provide ideology within professional norms and conventions.

As we shall see in the next chapter, the transport planning term 'street-car condition' stems from a legacy of tram systems operating in mix-travel conditions. Scholars classify this condition as the 'streetcar struggle' to underscore congestion effects from

growing road traffic on tram performance (Currie, Burke, & Delbosc, 2014). In Melbourne, this struggle represented—and continues to represent—almost its entire network. In turn, beginning around the mid-1950s, the state began applying a two-prong approach to car congestion: travel priority road measures on existing road space, and constructing new road networks to rectify bottlenecks and to shear-up ‘missing links’ (see Chapter 4). The two-prong approach accorded with transport planning in other cities, particularly in North America, and reflects contemporary transport planning in Victoria.

5.2.2 Committees, Commissions and Boards

The car’s normalisation as the primary travel mode motivated the state government to seek a stronger role in road space allocation, particularly at the metropolitan level. The *1932 Transport Regulation Act* created the Transport Regulation Board (TRB) and the *1935 Road Traffic Act* created the Traffic Advisory Committee. The Traffic Advisory Committee has received less attention compared with the TRB (Anderson, 1994).

The TRB’s main purpose was to reconcile economic tensions between railways which bore their own “capitalisation and maintenance costs” compared with road authorities who had “free access to a transport network constructed and maintained by the community” (Anderson, 1994, pp. 121-122). In comparison, the Traffic Advisory Committee was created to bring uniformity and clarity to traffic regulations, specifically to “make provision with respect to the control of traffic on roads” (State of Victoria, 10 December 1935). Compared to the TRB, the Traffic Advisory Committee had a larger role in road space allocation. It consisted only of local councillors and did not include a police representative as suggested by the MAV sub-committee, and was further charged with developing standardised traffic regulations for Victoria.

Victoria’s first standardised traffic code was introduced on June 11 1936 (*The Argus*, June 11, 1936). A few days prior to this *The Age* published the new traffic code in full with extensive pictures and detailed road rules (*The Age*, June 4, 1936). A film was shown in several movie theatres for a week to promote awareness (*The Argus*, June 29, 1936). The code enhanced policing powers to enforce driving on the left side of the road, and stopping at major intersections and behind stationary trams (Anderson, 1994). The code also provided an opportunity to add and clarify criteria used by the CRB staff when declaring a road. Roads with trams were classified as a main road; altered slightly later to include “busy thoroughfares” (Anderson, 1994, p. 139). The additional criteria of roads containing a tramway constructed by MMTB was added a

year later (State of Victoria, 23 December 1936, Section 7). Observance by motorists towards the new traffic code remained conflicting and contested (*The Argus*, July 16, 1938), and criteria applied by state transport planners to define and classify roads continued to be altered and debated (*The Argus*, July 15, 1939).

As Melbourne grew, residents began to live beyond existing train and tram networks. Growth in car ownership and travel did not occur evenly across Australia or indeed Victoria. Many Victorian suburbs still did not have paved roads. *The 1954 Town and Country Planning (Metropolitan) Act* sought to rectify issues generated from warring government and private planning authorities over increasing infrastructure challenges (*The Age*, October 19, 1954). The 1954 Act united land use, metropolitan roads, and water and sewerage under MMBW (Dingle & Rasmussen, 1991). Construction of Melbourne's freeway network began with MMBW's 1954 *Melbourne Metropolitan Planning Scheme* (Mees, 2000; Stone, 2008). However, the task of constructing a new freeway network proved difficult for MMBW (Davison & Yelland, 2004; Manning, 1991; Mees, 2000; Sandercock, 1990; Stone, 2008). In 1974 power to declare, operate and construct roads transferred from MMBW to the CRB (State of Victoria, 14 May 1974).

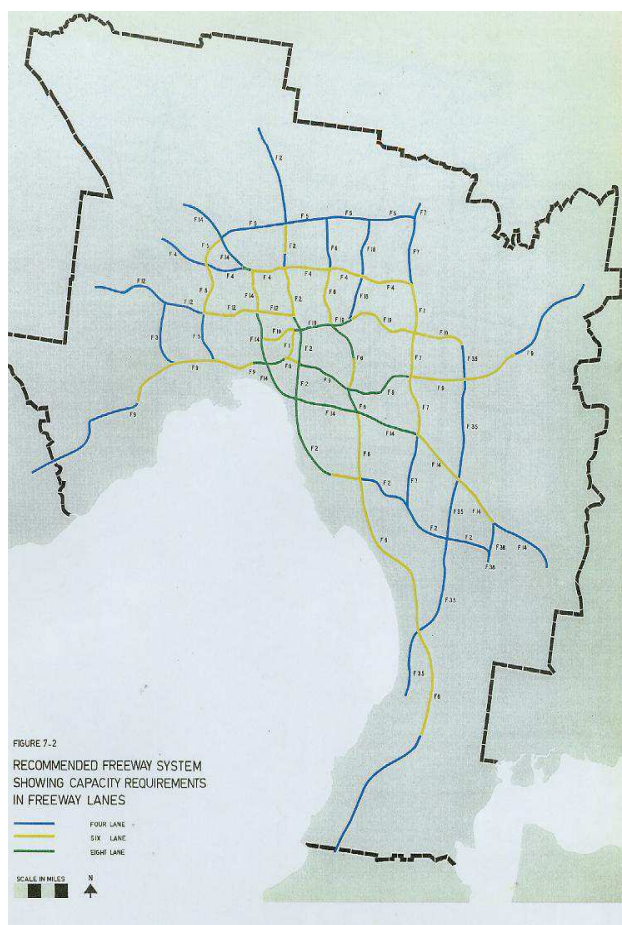
Figure 5.2: Trial of MTC travel survey, *The Age*



In 1963, the state created the Metropolitan Transportation Committee (MTC), a separate authority to advise government on planning and developing a coordinated road network. The MTC brought in North American consultants Wilber Smith & Associates to complete one of the first Australian computerised travel forecasts, "something MMBW accomplished in the 1954 Plan on paper" (Stone, 2008, p. 135). Under Bolte's tenure as Premier, the science and politics of transport planning were to be separated. Experts would scientifically study Melbourne and politicians and bureaucrats would develop the metropolitan transport plan (Davison, 2000). Beginning with a trial run in January (*The Age*, January 29, 1964), for three weeks Melburnians were flagged down by men standing by the roadside to them where they had come from and where they were going (Figure 5.2).

Survey techniques applied by MTC accorded with Australian metropolitan-wide transport studies at the time. The Adelaide Transportation Study (MATs, 1968) was the first such study, followed by Melbourne (MTC, 1969), Perth (RTSSC, 1971) and Sydney (SATS, 1975). UTMS techniques provided the core knowledge supporting MTC's work (see Chapter 2). MTC's two year investigation generated three volumes; the first two provided analysis, the third detailed the 1969 *Melbourne Metropolitan Transportation Plan*. Using 1985 as the horizon year, MTC recommended 600 km of freeways be built to accommodate projected car travel (Figure 5.3)⁸.

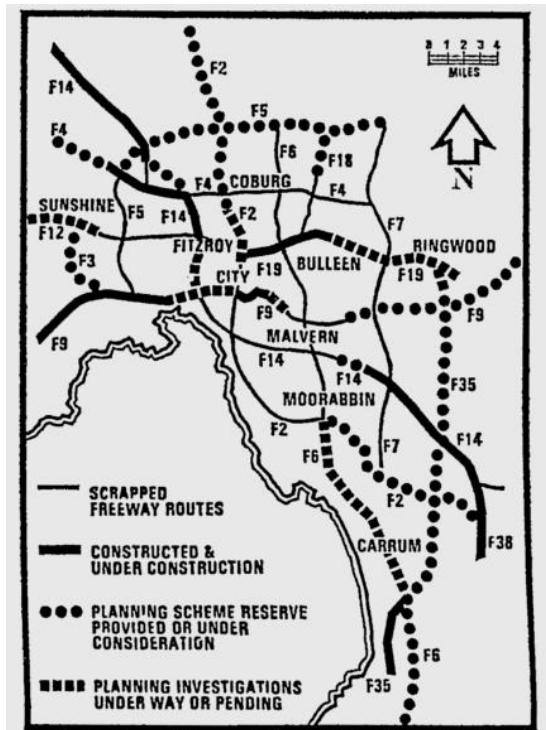
Figure 5.3: Proposed MTC freeway map



Less than a year after publication, a cultural shift occurred (Davison & Yelland, 2004). Melburnians began to openly question the science of transport planning. Inner-city communities began opposing being acquired for freeways. Political support for the cultural shift came in 1972 with the election of Rupert Hamer as Premier, and election of Gough Whitlam as Prime Minister of Australia. The state and federal campaigns highlighted the politics of urban freeway construction. Receptive to both freeway and non-freeway solutions, Hamer eventually revoked the more contentious inner-city freeways (Figure 5.4).

⁸ Figure 5.3 from (MTC, 1969). Figure 5.4 from Hills, B., Willingham, G., & Chubb, P. (October 14, 1974, p. 5). Figure 5.5 from *The Argus* (October 28, 1938), p. 12.

Figure 5.4: Revised freeway map



In Comparing Figures 5.3 and 5.4, MTC staff appeared secure in their scientific processes. The freeway map is absent any locational attributes to link it to Melbourne. Aside from a black census boundary line, the map reflects anywhere and nowhere in particular. Gieryn (2006) has made a similar point in his analysis of urban studies conducted by 'The Chicago School'. Following from Gieryn's analysis, we can see that the strength of MTC's work was their ability to scientifically jostle between perceiving Melbourne as a reference place for analysis (ie: a laboratory) and a physical place for investigation (ie: field-site).

Figure 5.5: MCC's proposed car parking ban, *The Argus*



Conversely, the map in Figure 5.4 hints that there is a city somewhere under the freeway network, with the label City. Whereas the organisational conventions of MTC reflected advanced transport planning processes at the time, the conventions were strongly questioned by scholars and society. Questioning the expertise of transport planners stemmed from decades of increased car regulations from multiple local and state governing authorities. From the late-1930s to the mid-1960s, cars became more and more regulated. For example, the MCC proposed city-wide parking bans during the mid-1930s (Figure 5.5).

By the mid-1950s, the MCC had introduced parking metres and the state had introduced a standardised parking infringement scheme. The regulations helped to alter organisational conventions and norms. In concert with growth in car travel and new organisational conventions and norms, Melbourne's road space—at least in inner-urban metropolitan areas—began undergoing significant change. Such change was particularly evident with the introduction of new technologies. Rudimentary road signage and road markings were replaced with electronic signalling and painted line markings. CRB staff first applied road line markings in the early 1930s, which consisted of simple, straight, unbroken lines. Staff shifted to painting broken lines along the centre of road space a decade later, primarily as a method to economise paint (Underwood, 1989, pp. 3-5). MCC began trialling traffic signals in 1930 and constructed its first multistorey car park in 1939 (Lewis, 1995; Priestley, 1984). By international standards, regulating pedestrian movements occurred much later. Flashing pedestrian “wait-walk” lights didn't appear in Melbourne until 1956 alongside the *1956 Road Traffic Act* (*The Argus*, January 17, 1956). Though technology aided in allocating road space, it provided a false sense of ordered road space. Competing travel modes still vied for use of road space.

5.2.3 First clearway controversy

The state's increased engagement in road space allocation continued with the *1953 Parking of Vehicles Act*. The 1953 Act provides a cornerstone to Victoria's contemporary infringement notice scheme (Fox, 1995). By the 1950s, the car's novelty had worn off. Professionals began treating the car as an accepted mobility artefact. Under the 1953 Act, motorists cited with a ‘parking infringement’ were afforded a choice to pay the fine instead of appearing in court. The 1953 Act also created the controversial concept “owner-onus”, which resulted in the car's owner being given the infringement. Owner-onus metaphorically as well as legally, tied a car's owner to their car. Thus, irrespective of driver who parked illegally, onus was placed on the owner to demonstrate a reasonable case for fighting the parking infringement.

The new parking infringement notice scheme signalled a further physical distancing of Melburnians from road space. Social norms had co-evolved with the arrival of the car, just as they had with MCC staff and tramway boards being informed by firsthand accounts with technology (Section 5.1). For example, the “open-dummy” or “workmen's” tram car design was used until the 1930s (Keating, 1970). Even when travelling faster than walking speed, time-space configuration of tram travel up to this

point had ensured passengers remained spatially and sensuously linked to road space (Figures 5.6 and 5.7)⁹.



Figure 5.6: Picture of open-dummy tram car, circa 1880



Figure 5.7: Illustration of workmen tram car, circa 1889

The 1953 Act introduced changes to organisational conventions around on-street car parking; mirroring similar social conventions around mobility infrastructure and regulation, such as paying parking fines. Yet, governance over road space allocation continued to be shaped by competing and multiple private and public authorities managing and constructing different aspects of Melbourne's mobility infrastructure. For example, the TRB and the Traffic Commission remained responsible for the declared road network and local government remained responsible for overseeing non-declared road space. Though governance did not change, conventions in transport planning accorded with societal changes. Instead of paying a fee directly to a traffic police officer, Melburnians could now simply mail in their payment.

⁹ Figures 5.6 and 5.7 from digitised collection of the State Library of Victoria.

In introducing the *1953 Parking of Vehicles Bill* to parliament, then acting Samuel Merrifield (Minister of Public Works), conveyed a sense that for considerable time, different council by-laws and state regulations had attempted and failed to control the on-street car parking problem. He cited a 1951 MMTB Report that documented how increased on-street car parking had exacerbated congestion reduced tram travel times. Merrifield declared that it was “readily obvious” that increased road congestion resulted in either requiring more trams in service to compensate, or an acceptance by the government and public of reduced standards (Victorian Parliament, 1 April 1953, p. 517). Merrifield stated that state authorities and transport operators had found consensus around measures outlined in the 1953 Bill. Although it contained proposals that “might be regarded as detrimental to some people,” its overall objectives would outweigh the negative outcomes (Victorian Parliament, 1 April 1953, p. 516). The opposition was completely opposed to the bill. Opposition leader Trevor Oldham declared that the measure was radical, and incorporated ideas that were “revolutionary” and would affect all Victorians (Victorian Parliament, 1 April 1953, p. 521). Arthur Rylah further acknowledged that although the “greatest traffic problem” of the time was car parking, the bill represented an “ill-considered” and “dramatic attack on motor vehicles” (Victorian Parliament, 1 April 1953, pp. 573, 576). The opposition’s distrust of the 1953 Act rested on a belief that on-street car parking problems were largely an inner-urban metropolitan matter. Thus, the act was ill-suited for conflicts found in outer suburbs, and would thus disproportionately affect motorists needlessly. To assuage concern, the Labor Premier at the time, John Cain Senior, declared it would initially be restricted to road space within Melbourne on a trial basis (Victorian Parliament, 1 April 1953, p. 581). Owner-onus was eventually rolled out across Victoria, and the state continued to seek greater standardisation of on-street parking restrictions, particularly during peak travel periods.

In addition to owner-onus, the rise of car parking studies also signalled changes within professional practice. Different planning disciplines had become professionalised around the 1920s through associations, trade unions and institutes (Millerson, 1964), but it wasn’t until the 1950s that professions began actively shaping planning in more strategic and meaningful ways (Boreham, Pemberton, & Wilson, 1976). Parking studies conducted during this period therefore echoed a new professional phenomenon. Contemporary studies point to a circular logic contained in parking provision assumptions: accepting parking maximums as a given result in dictating

parking demand (Shoup, 2005). Although the sentiment has its merits, assumptions first had to be created. Car parking studies provided an avenue to accomplish this task.

The terms 'parking' and 'problem' were a consistent theme in context and title to early car parking studies (CDA, 1955, 1958; MMBW, 1956). Though professionals had yet to develop a science around car parking provision, there was a general consensus around the fact that at the very least, *car parking was a problem*. Just as in the Commission's work on the 1929 *Plan* and MTC's 1969 *Transportation Plan*, professionals looked to North America for guidance (Bell & Bell, 1993; Rolfe, 1998). In 1954, the MCC created the new Traffic Engineering branch within its engineering department (Underwood, 1989). The first appointed traffic engineer J.M. Bayley, received an award in the same year to undertake postgraduate studies at Yale University's Bureau of Highway Traffic in North America (Underwood, 1989).

Changes within professional transport planning practice, combined with continued attention by the state government, resulted in the creation of clearways, which banned all vehicles from parking on specified roads during commute periods. This in turn helped to further develop and refine professional norms and conventions. For example, the 1956 Road Traffic Act replaced the TAC with the Traffic Commission. The new Traffic Commission consisted of a three member panel: a police representative and two experienced traffic engineers, one from CRB and MMBW (State of Victoria, 12 June 1956). By this point, car travel in Victoria, as in the rest of Australia, increased for the first time at the expense of public transport ridership (see Tables 1.1 and 1.2). Like the TAC, the new Traffic Commission was to provide advice on improving traffic conditions and regulations (Anderson, 1994).

As the car had become the primary mode of daily travel, Traffic Commission members focused their energy primarily on car travel. From 1957 up to late 1963, the Traffic Commission worked with inner-urban municipal councils to implement clearways.¹⁰ The Commission initially received little support from councils (*The Age*, December 11, 1964). As councils wanted to retain control over their road space, they were slow to respond to the state's desire to implement clearways. Although no-parking zones and clearways result in similar outcomes and are based on similar objectives; the former is a local government measure, while the latter is a state measure. Thus, local

¹⁰ The Commission's case was based on traffic surveys that had continually documented commute travel congestion as an increasing problem (*The Age*, April 8, 1958, August 1, 1956, December 21, 1961, February 7, 1957, July 27, 1957, June 17, 1959, March 15, 1957).

governments argued no-parking measures were sufficient, and the state, seeking greater control over declared roads, argued for clearways.

Professional changes occurring to transport planning knowledge, norms and processes at the time, partly account for why state and local transport planners found consensus around how to resolve on-street car parking conflicts. For example, in addition to Urban Transportation Modelling System techniques crucial to MTC's 1969 *Transport Plan*, several notable professional publications had been in circulation up to this point.

The first notable publication was the North American *Highway Capacity Manual (HCM)*, first published in 1950 (TRB, 2000). In relation to UTMS techniques, the 1965 HCM edition established the first set of professional guidelines and standards related to Levels of Service (LOS) (Kittelson & Roess, 2001). LOS reflects volume/capacity ratios that help measure and effectively prioritise speed and unfettered car travel. For the purposes here, a simplistic explanation of LOS consists of six alphabet letters A-F. Letters represent differing perceived road operational capacity. Thus, LOS helps to define both capacity and congestion. For example, LOS of A represents optimal road conditions from a traveller's perspective, where there is no perceived congestion or delay in travel time. In contrast, LOS of F represents a point when a road's operational capacity is broken due to severe congestion, where travellers remain stationary for periods of time. The normative determination of volume and capacity placed on different road classifications mean that both are value-laden constructs. Regardless of whether a transport planner allocated road space for a car, bicyclist or pedestrian, travel was measured against normalised levels of service. In contemporary practice, transport models forecast LOS as a key output to assist in evaluating scenarios.

Another notable publication in circulation during this time period was Buchanan's (MoT, 1964) *Traffic in towns*, published in 1963 (discussed in Chapter 2). Davison (2004, pp. 134-142) provides a more detailed account of Buchanan's keynote address to a 1964 Melbourne conference. In summary, the 1964 conference underscores changes within transport planning and organisational conventions occurring at the time. Two international experts, Burton Marsh from North America, and Colin Buchanan from Britain, provided companion keynote addresses. The respective titles of the two addresses summarise the 1964 conference's importance. Whereas Marsh spoke about "the influence of traffic engineering on the road user", Buchanan addressed "the relationship between land use and traffic generation" (RACV, February 24-26, 1964).

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Ideas articulated in both titles clearly reveal a vision of limitless mobility and related, yet divergent approaches to achieving the vision.

To summarise, car parking studies and publications such as the 1950 HCM edition and Buchanan's 1963 study, signalled changes to transport planning and organisational conventions. These changes mirrored wider changes to society around car ownership. The result of these changes altered what constituted appropriate and adequate organisational conventions and a more formalised transport planning profession.

As 1964 came to a close, local governments slowly submitted their official support for clearways. When combined, clearways would cover a total of 174 kilometres of road space in Melbourne. The councils of Collingwood, Brunswick and St. Kilda—containing some of the more congested commute traffic—remained steadfast in their opposition to clearways (*The Age*, December 17, 1964). A 1964 *Age* editorial summarised the clearway crises and the actions of the three councils as difficult to understand.

Traffic congestion exacts a heavy toll on the community in delays, waste and accidents. In the long run, the problem must be met by the construction of more freeways and the provision of off-street parking.... Only city-wide planning and co-ordinated effort can hope to bring traffic problems under control.... Recalcitrant councils cannot expect to stem the flow of through traffic (*The Age*, December 18, 1964a).

The title of another article in the same edition provided a reminder of how governance shapes road space allocation: "Power to Force Clearway Plan" (*The Age*, December 18, 1964b). The 1956 *Road Traffic Act* empowered state authorities to compel local governments to co-operate with state road measures. From a legislative perspective, the three local governments had no choice but to accept clearways on declared roads within their jurisdiction. Remaining questions as to definition or responsibility of clearways were later resolved with the 1965 *Road Traffic (Clearway) Regulation* (State of Victoria, 27 April 1965).

Before jumping several decades to examine the second clearway controversy, we can make some brief observations regarding the discussion up to this point. Though caution is acknowledged when making the following claims, it is clear that the majority of constitutive elements had changed little since the turn of the 20th century. For instance, the 1964 clearway controversy marked a point in Victoria's history when different state authorities, the state government, and many stakeholders, found consensus around the idea that regulating car travel was too important to remain in the

hands of local government. This provides the context for understanding why the constitutive elements of road space intersected, but not for how. Governance remained largely unchanged since the turn of the 20th century. Similarly, though the wider transport planning profession had changed significantly with regard to knowledge and professionalisation, conventions and norms found in practice remained largely guided by the dominant car paradigm and thus concerned with facilitating unfettered car mobility. And finally, the roads and tram lines built prior to the car's arrival remained largely unchanged. Thus, whereas the spatial tension was resolved one way prior to the car's arrival, it was subsequently resolved another post its arrival. During the first clearway controversy the car provides but one element in explaining how road space was actually allocated. Following on from this point, we can trace the contours of materiality to Melbourne's narrow road corridors and extensive tram network. With these points in mind, we now turn our attention to examining the more recent clearway controversy that introduced this thesis.

5.2.4 Second clearway controversy

Scholars have documented VicRoads dominant role in transport planning (Anderson, 1994; Low, et al., 2003; Stone, 2008). At a structural level, VicRoads has changed very little since its creation in 1989 (Chapter 4). Yet, like most government authorities, VicRoads is not immune to changing social, political and professional realities. VicRoads 2002 Corporate Plan marked a slight departure in its corporate mandates (VicRoads, 1990, p. 2; 2002a, p. 5). For example, 'integrated planning' was formally defined in VicRoads corporate plans as "road transport planning will be integrated with land use planning and planning for other modes of transport" (VicRoads, 1994a, p. 16). The 2002 Corporate Plan revised integrated planning to include:

Working with the DoI, freight and private transport operators, and other stakeholders, VicRoads will ensure that all aspects of road and traffic management respond to the needs of freight, road based public transport, cycling and walking to: *reduce car dependency*, encourage more environmentally friendly transport, promote sustainable development through appropriate links to land use planning (VicRoads, 2002a, p. 10, emphasise on italics).

The inclusive set of stakeholders accords with prior attempts to include a plethora of issues and state authorities when defining integration. But, the definition did mark the first time that a core aim of the state's road authority was to reduce car travel. Prior mandates charged to RoSTA, RTA, PTC or DOT, dealt squarely with engaging road space allocation, often to the detriment of the car. Thus, VicRoads altered mandate

finally caught up with similar legislative mandates found in other state authorities, one of which was to 'reduce car travel'. Compared with VicRoads original mandate, the 2002 Corporate Plan indicates an expanded corporate direction to prior CRB, RCA and VicRoads annual reports and corporate documents that made no such claims.

Two years later VicRoads created the Tram 109 department under the *Major Projects* division (VicRoads, 2004), and four years after that the Tram 109 department became the *Bus and Tram* division (VicRoads, 2008). Both were supported legislatively with the *2004 Road Management Act* (State of Victoria, 11 May 2004). As forwarded by Minister Robert Cameron during the second reading in Parliament, the 2004 Act was intended to address longstanding unanswered questions regarding what Melbournians wanted from their roads.

What do our communities want from their roads? What can our communities afford? Who decides? And by what criteria? And who is responsible when results do not match expectations? (Victorian Parliament, 4 March 2004, p. 292).

As we have seen, the questions Minister Cameron addressed were not new. The 2004 Act sought to simplify and clearly articulate road space governing responsibilities.¹¹ Since the 1980s, different state and local policies and legislative acts had generated 'general understandings' between different local, state and private authorities. Any given road contains mobility infrastructure, such as street lights, tram stops and tram shelters. However, it was difficult to determine who exactly the responsible authority was for constructing, maintaining and altering such infrastructure in day-to-day routines and meetings. The 2004 Act was therefore intended to clarify governance responsibilities. For instance, in consultation with local governments, VicRoads was provided greater power to develop road management plans. A Code of Practices was developed to support the process. The Codes did not have power of law but were viewed as best practice documents; codifying existing professional processes that had developed over time (Victorian Parliament, 4 March 2004).

The 2004 Act sought to promote safe and efficient road networks in Melbourne, and achieve a more coordinated management of road reserves. To achieve these objectives, the Act set out 11 strategies, one of which identified the need to develop a road classification system with "clear principles" to assist in clarifying "the division of

¹¹ Information was obtained from various sources, including correspondence with VicRoads employees.

responsibilities between State and local road authorities” (State of Victoria, 11 May 2004, Part 1, Section 4). The 2004 Act was intended to clarify administrative confusion around road space allocation, yet remained based on road classifications. Thus, VicRoads had the power to declare or revoke a road based on the simple three designations of freeway, arterial or non-arterial (Part 3, Section 14(1)). In contrast to criteria outlined in the *1912 Country Roads Act* that included “based on the opinion”, the 2004 Act outlined that when declaring a road, whether:

[I]t’s a principal route for the movement of people and goods between major regions of the State, or between major centres of population or between major metropolitan activity centres, or to major transport terminals, across or around cities, is a major route for public transport services, had Statewide economic or tourism significance, or provides necessary connections between arterial roads (State of Victoria, 11 May 2004, Part 3, Section 14(3)).

The 2004 Act marked 70 years of disagreement, vagueness and discrepancies in defining road space. It is logical to assume CRB staff would have employed criteria such as “movement”, “public transport route” and “economic or tourism significance” when providing “their opinion”. Thus, the 2004 Act again marks changes to transport planning and organisational arrangements, not necessarily governance. Two years after the passing of the *2004 Road Management Act*, John Brumby, then State Treasurer, initiated a Victorian Competition and Efficiency Commission (VCEC) inquiry into managing Victoria’s growing congestion.¹² The 2006 inquiry’s scope focused on four specific aims: 1. the nature and incidence of congestion, 2. its impact on business, 3. existing regulatory and institutional barriers to reducing congestion, and 4. documenting existing international examples to resolve congestion (VCEC, 2006, p. vi).

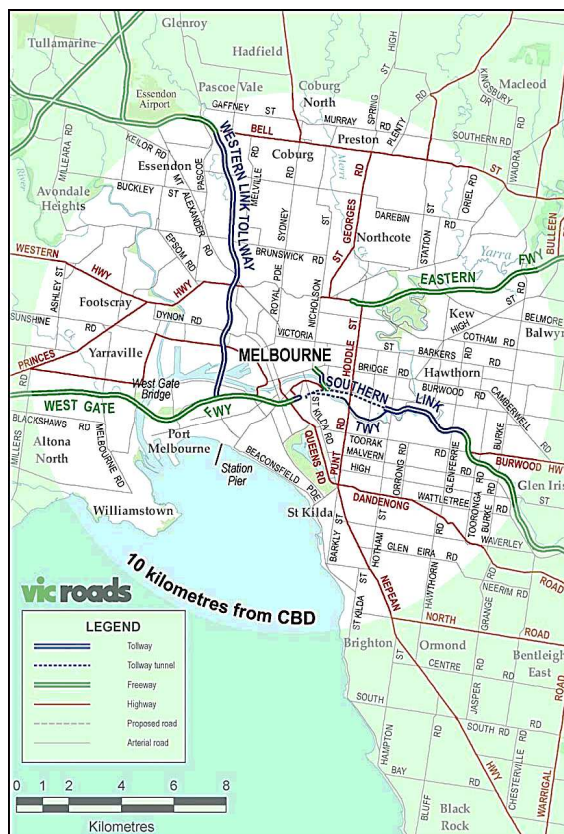
VCEC’s final report consisted of 137 submissions from advocacy groups, a range of professional and scholarly transport planners, and 16 stand-alone reports from five separate consulting firms covering topics ranging from parking restraint measures and taxation to infrastructure expansion. The report therefore further marks a change in professional norms and conventions around transport planning. This is a key difference from the earlier 1964 clearway controversy. Whereas the first controversy was guided by norms and conventions concerned with facilitating unfettered car mobility, evidence, arguments and ideas contained in the final report clearly questioned

¹² VCEC remains the primary state advisory body on business regulation reform. It is charged with improving the state’s competitive position both within and outside of Australia

this objective (discussed in more detail below). The report was released on 14 March 2007. Five months later Brumby became Labor's new Premier for Victoria.

The roundtable had discussed increasing clearways operating hours. On 29 April 2008 the state announced its “Keeping Melbourne Moving” initiative (Victorian Government, 2008). The announcement also included altered clearway times. New clearway hours were: 6:30–10am and 3:00–7:00pm. Stricter state enforcement to tow cars during clearway times was also promised. Clearways would be standardised within a 10km circle around Melbourne’s CBD (see Figure 5.8).¹³

Figure 5.8: Map of proposed clearways



Contested negotiations between local councils and VicRoads followed the announcement. Battle lines were drawn between two camps. The first maintained standardising clearways would reduce motorist confusion and ‘unclog’ road space. The second camp maintained they would create ‘traffic sewers’ harm businesses and fail to resolve congestion. The controversy went to the Victorian State Supreme Court. Similar to the 1964 clearway controversy, VicRoads has the legal mandate to compel councils to extend clearways on declared roads.

Examining the second clearway controversy shows how transport planning, governance, organisational conventions, and infrastructure, therefore intersected differently when compared with the 1964 controversy. The most apparent difference relates to the dramatic rise in car ownership. In 1965, 611,497 motor cars were registered in Victoria (Archer, 1965); compared to over 4 million in 2010 (ABS, 2011).

¹³ Figure 5.8 from personal correspondence (Brown, 2009).

Of the total registered cars in Victoria, roughly 400,000 travelled during peak commute periods in 1965, compared to over 1.2 million in 2010 (see Chapter 1). Even if scholars reached consensus in defining congestion, which they have not, the sheer volume of cars during the second controversy was substantial. The different levels in car volume also highlight the very normative and often hyperbolic characterisation of congestion.

In contrast with the 1964 clearway controversy, state and local transport planners also questioned assumptions held within the dominant car paradigm. For example, if clearways would benefit only motorised travel, or all travel. Yet, similar to the prior controversy, the state road authority (this time VicRoads) remained charged with managing Melbourne's declared road network. The state's decision to extend clearways also occurred during the run-up to a state election. The extended clearway times remained for only 10 months, at which point Labor was voted out and clearways in most councils, returned to their original operating hours. On December 9, 2010 the newly elected Premier of Victoria Ted Baillieu visited Stonnington to fulfil a campaign promise – rolling back clearways (McMahon, December 10, 2010). Labor had been publically criticised on multiple planning fronts related to infrastructure planning and delivery (Fyfe & Millar, December 12, 2012). Thus, the politicisation of the clearway controversy played some role in the change of state government.

Findings from many of the consultant reports commissioned by VCEC suggest the powerful impact of politics and organisational conventions. Review of consultant reports also reveals detailed analysis that questioned the validity of implementing clearways as a stand-alone road measure. For example, a consultant report entitled *Effective Utilisation of Road Space on Arterial Roads* documented the potential benefits for packaging supportive road measures (Booz Allen Hamilton, 2004, chapter 4). The consultants developed a methodology to examine the effectiveness of different road measures, based on the criteria of 'throughput' and 'safety' (Booz Allen Hamilton, 2004, chapter 4). Measures were examined in isolation first to ascertain its overall performance, and then compared as bundled sets.

Table 5.1 analyses the findings identified (Booz Allen Hamilton, 2004, p. 18 and 19).¹⁴ Road measures in grey boxes performed best when combined together and road measures in non-grey boxes performed best as single measures. For example,

¹⁴ Table 5.1 combines two separate tables from the Booz Allen Hamilton report, specifically Table 6: Relative Effectiveness (page 18) and Table 7: Complimentary Options (page 19).

combining the road measures of ‘traffic queue and single bypass’, ‘signal priority’ and ‘signal coordination and optimisation’, provided optimal road space allocation based on person through-put. Conversely, implementing ‘car parking removal’ as a stand-alone measure (as done with clearways), provided optimal road space allocation based on vehicle through-put.

Table 5.1: Comparison of different road space allocation measures, revised from Booz Allen Hamilton

Vehicle Throughput	Person Throughput
Dynamic pedestrian operated signal crossing Unconventional intersections Right turn bans Increase bicycle lane length	Traffic queue and single bypass Signal priority Signal coordination & optimisation
Car parking removal Reversible lane New lane One way street Halve parking turn over Shift bicycle lane	Bus/tram lane High-occupancy vehicle lane
New median Undivided to right-turn lanes Undivided lane to two-way right turn lanes Median to two-way right turn lanes Undivided to U-turn Halve access points	

By way of summary, the way clearways were implemented emerged from actions and decisions that occurred in real time, over the course of several months. Irrespective if transport planners were aware of the consultant’s findings (findings presented in later chapters suggest many were), how constitutive elements intersected reveal how knowledgeable actors actively engaged in debate and made decisions. For example, local governments debated where clearways would physically start and end, in relation to road intersections within their respective jurisdiction. Negotiations generated a type of by-product, or residue. *A main objective of standardising clearways was to minimise confusion.* Heated discussions between VicRoads staff and 13 local council governments resulted in different clearway times during two years of consultation.

The second clearway controversy therefore provides an ideal example for understanding the ways in which transport planning is constrained and constituted. For instance, Moreland Council agreed to a 3pm clearway start time within 100 metres of an intersection by late 2009, which resulted in 244 cars towed the following month (Bunbury, December 6, 2009). Thus, heated negotiations generated further discrepancy in clearways, defeating a core objective. Further, most—but not all—clearways were reversed once the Liberal government came into power. Consequently, the outcome of how constitutive elements intersected in the second

clearway resulted in less standardisation of clearways. The process also helped to create residue generated from negotiations. The residue impacted unrelated VicRoads projects being conducted at the time—a point elaborated in subsequent chapters.

Six years after the *2004 Road Management Act*, the ALP government passed the *2010 Integrated Transport Act*. Part II of the 2010 Act provided for unprecedented sections compared to previous transport legislation, outlining a Vision Statement, Objectives, Principles and Statements of Policy Principles (State of Victoria, 2 March 2010, Part 2). Under the Integration of Transport and Land Use objective, the 2010 Act stated the “transport system should provide for the effective integration of transport and land use and facilitate access to social and economic opportunities”. And in addition to achieving this objective, effective integration of transport and land use should aim to “improve accessibility and transport efficiency” with a specific focus to provide improved access to all land use sectors. And most importantly, to facilitate “better access to, and greater mobility within, local communities... and reduce “the need for private motor vehicle transport and the extent of travel” (State of Victoria, 2 March 2010, Part 2, Section 11 (1) and (2)). For the first time, a core transport specific piece of legislation explicitly detailed that the primary focus of state transport and land use planning authorities should be to reduce the need for car travel and travel overall.

5.3 Chapter summary

This chapter has shown that how organisational conventions responded to changing cultural norms around mobility was not linear, but reflected a slow, meandering path of conflict and debate. With respect to understanding professional norms and conventions that facilitate and constrain road space allocation, several findings can be made.

First, we have seen how local governments in Victoria have remained legislatively confined in their capacity to allocate road space within their municipal boundaries. In Chapter 4, governance for road space allocation was found to be set well before the arrival of the car. This delineated the general boundaries of policy discussion, as well as set the stage for future conflicts. Yet, as this chapter has revealed, governance alone is insufficient for understanding how different road space allocation tensions are resolved. Specifically, changes in transport planning knowledge and conventions were found to co-evolve with the car’s normalisation in Melbourne. Thus, governance established the rules of the game, but not for how the game was played. Early on-street car parking controversies were resolved by transport planners by drawing from existing knowledge and organisational conventions, derived principally from

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experiences with horse-drawn carriages. Thus, learning the pitfalls to parking was something both government and the general public learnt together.

Second, it was shown in Chapter 4 that politics and legislatively mandated responsibilities constrain and limit how practitioners view and allocate road space. Evidence presented in this chapter substantiates this finding. The most obvious example examined in this chapter centres on both clearway controversies. The ways in which clearways were implemented during both the 1964 and 2010 controversies emerged from actions and decisions that occurred in real time, over the course of several months. As such, the outcome of how the constituted elements intersected was not known in advance. Importantly, the contours of materiality with respect to Melbourne's narrow road corridors and extensive tram network were central to both controversies.

Third, normative decisions made by practitioners are found to make small changes which shape how road space is allocated. The car grew to become the key criterion to resolve the spatial tension with respect to on-street car parking. Resolving the spatial tension in turn was accomplished in different ways depending on professional norms and conventions. For example, addressing on-street car-parking needs and concerns was accomplished in tangent with the assumption that the car was the primary mobility mode, instead of conceptualising mobility as an amalgamation of "interlocking machines, social practices and ways of dwelling" (Sheller & Urry, 2000). This views mobility as singular, unconnected and privatised, and further underscores how norms and conventions facilitate and constrain road space allocation.

To further understand how different road space allocation tensions are engaged and resolved, Chapter 6 examines how the capacity tension is resolved, Chapter 7 examines how the liveability tension is resolved, and Chapter 8 examines how the network tension is resolved. Though different chapters within the thesis examined one tension in particular, analysing road space allocation reveals that resolving one tension often in turn brings another tension to the fore which needs tending to.

Chapter 6 – Road space allocation and infrastructure

This chapter analyses how infrastructure influences road space allocation. This is second of the four key objectives outlined in Chapter 1. This chapter also marks a trend that carries through to Chapter 8 in narrowing analytical scope. Whereas Chapters 4 and 5 applied a broad lens, this chapter narrows its analytical gaze to road space allocation. This is reflective of source material discussed in this chapter, which include a variety of original government policy documents, as well as interview material from face-to-face interviews with over 60 practicing and retired transport planners.

We begin by examining the first tram Fairway programme rolled out during the early 1980s. This sets the stage for understanding resolution to the capacity tension, the second of four road space allocation tensions identified in Chapter 2. In summary, the capacity tension highlights the ‘how’ of road space allocation. The tension underscores the contested transition towards a demand management stance; defined as the destabilisation of the dominant car paradigm. Whereas demand management is now generally accepted by scholars and practitioners, the shift away from a predict-and-provide ideology was still occurring during the 1980s when Fairways were introduced. The Principle Public Transport Network policy, first presented in the state’s policy document *Melbourne 2030*, is then examined. The policy provides important context to understand more recent Fairway and tram-related projects and trials. Tram priority projects implemented by local government are then examined, with an examination of a tram priority trial conducted by the state authority VicRoads concluding the chapter.

Highlighting the material contours of infrastructure in road space allocation reveals recurring themes that affect how the capacity tension is resolved in Melbourne. Chapter 5 revealed the contours of materiality with respect to road space to some extent. Materiality is brought to the fore in this chapter by analysing different tram priority projects and trials. This helps establish re-occurring problem definitions and solutions in transport planning. In particular, uptake of a demand management stance is found to be deeply contingent due to unstable and ever-changing mobility visions developed by different state governments. This provides insight into greater reliance on—though professionally and institutionally bounded—the trend for increasing discretion of transport planners. This provides a deeper understanding of difficulties related to adopting a demand stance in practice and organisational conventions to support professional practice.

6.1 How governance helps reconcile the capacity tension

6.1.1 Tracing how Fairways intersect with governance

Under the *1983 Transport Act*, the state authorities of the RTA and the MTA were charged with implementing priority schemes for Melbourne's tram network (see Chapter 4). The MTA reported that 1982 tram travel times had become longer than the pre-war period, despite modern rolling stock and technologically superior system improvements (Daley, 1987). In late 1983, the Minister of Transport directed the RTA to develop a formalised low-cost tram priority programme. The result was the creation of Fairways (Howie & Daley, 1984).

A Fairway is a state mandated policy consisting of different technology and infrastructure measures and strategies aimed at improving both the reliability and speed of the tram network. The first Fairway programme included new roads, kerbing and signage; violation cameras placed at key intersections; minor land acquisition; part-time and full-time tram lanes; yellow line road markings adjacent to tram rails; and the creation of regulation 515 which required—when possible—that motorists did not delay trams (Daff & Freemantle, 1984; RTA, 1989).

The first Fairway programme was introduced by the state government with the broad goal of “encouraging greater use of public transport” and “reducing tram travel times and the variability of tram travel times” (RTA, 1985, p. 1). Since 1983, the tram network has undergone five Fairway programmes. Table 6.1 identifies the stated purpose, objective(s) and road measures implemented under each programme. Although attention placed on achieving reliability and speed has differed between programmes, supporting technology and infrastructure has remained relatively constant. The most notable characteristic of the Fairway programmes has remained the yellow line adjacent to tram rails.

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Table 6.1: Objectives and strategies for different Fairway programmes

Year	Title	Purpose	Objectives	Strategies
1983 (1)	Fairway programme	Improve reliability and travel times for trams	<ul style="list-style-type: none"> - During peak travel, clear trams at signalised intersections on next complete green period after joining the queue (i.e. minimum level of service) - Prevent trams being impeded by road traffic between signalised intersections - Provide trams priority in counter peak at critical locations to reduce later trip delay 	<ul style="list-style-type: none"> - Special signs and line-marking along the tram routes to provide a clear way for trams - Develop new traffic signal technology to enable tram priority to be provided at intersections - Road improvements to provide local widening for an extra lane or safety zone to protect waiting passengers at sites with high tram delays
1988 (2)	Fairway programme Mark II	Develop Light Rail network to provide for radial movements particularly to central city	<ul style="list-style-type: none"> - Minimise deterioration of benefits from existing Fairways through ongoing monitoring and adjustments to system - Rectify specific sites with high tram delays and/or operational problems - Focus on corridors not serviced by trains and provide standardised comfort and journey speed comparable to that of trains 	<ul style="list-style-type: none"> - Intersection widening and safety zone installation - Extend Automatic Vehicle Monitoring (AVM) to cover the operational fleet with consequent improvements in operating efficiency and passenger security
1996 (3)	Light Rail	Continue to develop Light Rail system with higher frequency service off-peak (evenings & weekends) to increase revenue from patronage to offset costs from higher service level	<ul style="list-style-type: none"> - Allied strategies need to be directed towards enhancing tram priority towards light rail services in road system 	<ul style="list-style-type: none"> - Extend and refine Fairway system - Further incorporate tram priority within VicRoads Urban Traffic Management System (UTMS) traffic signal system and linking UTMS to AVM
2002 (4)	Principal Public Transport Network	<p>Policy 8.1 Upgrade and develop PPTN to connect activity centres and link Melbourne to the regional cities</p> <p>Policy 8.2 Improve existing public transport network operation with faster, more reliable & efficient on-road & rail public transport</p>	<ul style="list-style-type: none"> - 20% of motorised trips completed by public transport by 2020 - Better utilise existing public transport network to increase public transport choice, reduce car dependency and meet mode share 20/2020 target 	<ul style="list-style-type: none"> - Produce service/management plan - Define & publish public transport service targets - Identify key public transport routes - Work with bus industry to develop service feed system - Identify/develop strategies for 'red spots' - Undertake annual programme of road management
2004 (5)	Think Tram	"Tram To It" Programme (latter badged Think Tram) designed to shorten tram journey times, improve tram reliability and reduce congestion for motorists & freight traffic	<ul style="list-style-type: none"> - Route-by-route upgrade projects of road and traffic works to speed up tram flow and improve reliability - Education and enforcement of tram-related road rules - Review/adjust operational strategies and timetables to provide immediate benefits at particular intersections delaying trams 	<ul style="list-style-type: none"> - Traffic signal and other priority treatments - Where possible separate cars/trams between intersections - Urban design improvements - Better, safer access for passengers - Review regulations and penalties to ensure rules on par with other road safety penalties - Education campaign, better signage and training - Increased enforcement

(1) (Giummarra, 1990; VAG, 1998) (2) *MetPlan* (MoT, 1988), *MTA AR 1987/88* (MTA, 1988) (3) *Transporting Melbourne* (DoI, 1996) (4) *Melbourne 2030* (DoI, 2002), *Victorian Transport Plan* (DOT, 2008b) (5) *Linking Melbourne* (DoI, 2004a), *Track Record #17* (DoI, 2004b), *MOTC* (DoI, 2006)

A large portion of Parliamentary debate concerning the *1983 Transport Act* centred on policies advocated by the newly elected Labor government over road measures aimed to reduce tram and car interaction. The parliamentary debate foreshadowed the success of the first Fairway programme, as well as reflected how infrastructure provision had become interpreted through the lens of the car. In referencing an RACV submission during parliament debate, Liberal member John Delzoppo stated the majority of Melburnians did not accept the government mandate to increase priority for public transport in Melbourne. Delzoppo cited the failure of the New South Wales government to increase public transport ridership when it attempted to provide such measures (Victorian Parliament, 31 May 1983, pp. 4745-4746). Whether one “liked it or not” Delzoppo concluded, society revolved around the car (Victorian Parliament, 31 May 1983, p. 4746). In contrast, National Party member Bruce Evans, remarked that road construction was “self-defeating” in metropolitan areas such as Melbourne. He concluded no city in the world had solved road traffic problems by constructing more roads (Victorian Parliament, 31 May 1983, p. 4757). Although Evans’ never explicitly used the term, his insinuation of induced demand was overshadowed by the opposition’s belief that the 1983 Act was at its very heart overly pro-public transport.

The parliament debate repeatedly questioned the government’s proposals for “clearways for trams” (Victorian Parliament, 31 May 1983, p. 4766) or providing the tram’s greater priority “over the motor car” (Victorian Parliament, 31 May 1983, p. 4764). Liberal member Morris Williams succinctly summarised the opposition’s stance, declaring that it was plainly obvious that driving from the city to outer suburbs by car (particularly during peak periods) was becoming slower and slower. “Grandiose ideas of clearways” to provide priority along strip shopping centres for trams would ultimately fail and worse, sever the lifeblood of the outer suburban areas because “traffic comes from the motor car not from the tram” (Victorian Parliament, 31 May 1983, p. 4773).

Roll-out of Fairways began with pre and post testing along a 10.3 kilometre section of the North Balwyn tram route in September 1983 for two weeks (Daff & Freemantle, 1984). A comprehensive “marketing and public education programme via television, newspapers and pamphlets” occurred in concert with preliminary testing (Sinclair Knight Merz, 2004, p. 3). Though road measures identified during pilot testing and surveys revealed low compliance, RTA staff determined such findings had minimal impacts on tram operations (RTA, 1985). Based on the findings, state officials were satisfied the programme achieved its purported aim and it was rolled out to other tramlines (Daley, 1987). Two years later 55 traffic intersections had been retrofitted

with “tram detection and controller software to lengthen green times... [and] facilitate tram operations” (Pak-Poy & Kneebone, 1982, p. 2). By 1985 different measures were implemented on 37 of the total 250 kilometres of Melbourne’s tram networks (RTA, 1985). By late December 1988 the programme achieved practical completion from the perspective of the state government (RTA, 1989).

Prior to the official roll-out of Fairways, a consultant report identified potential issues with prioritising trams at the expense of the car (Pak-Poy & Kneebone, 1982). Similar concerns had been previously noted by RTA staff. Evaluation studies conducted between 1985 and 1986 documented that the part-time tram lanes and turning restrictions had the lowest compliance (Williamson, 1987). Though poor compliance did not overly impact tram operation, RTA staff noted in summary reports that the Fairway’s credibility and long-term success required “improving public acceptance and overcoming problems evident with the current arrangements” (RTA, 1985, p. 2). Governance in place at the time necessitated more contentious road measures be supported politically and financially by the state government. The then Minister for Transport, Steve Crabb, recognised this need and forwarded Regulation 515.

Regulation 515 was based on “issues of equity” (Clarke, July 26, 1983). Equity was defined based on observing the different carrying capacity of trams and cars. Trams often carrying more than 60 people were being held up by one car carrying a single motorist attempting to turn at an intersection or onto a side street. Chapter 5 drew attention to the influence of the *Highway Capacity Manual* on MTC’s 1969 *Transport Plan*. Decades of professional experience and scholarly studies had yet to reconcile issues of equitable allocation of road space in relation to LOS measures, which remained misunderstood by the public and difficult for professionals to measure and correlate to existing travel conditions (Roess & McShane, 1987). A need remained for a more explicit distinction between vehicle throughput and person throughput. Thus, Regulation 515 reflected growing consensus within Melbourne’s transport planning profession that equitable allocation of road space be based on person throughput. In Chapter 7, we see that refining LOS measures based on issues of equity and priority of road space is a central feature of contemporary processes being applied by VicRoads.

Choosing to operate traffic signals based on the normative criteria of vehicle or person throughput, occupied—and continues to occupy—the majority of time and energy of transport planning. Providing a green light for a specific road or specific mode (in the case of Fairways) results in perpendicular roads being given a red light. Aside from

expanding a road's capacity to accommodate mobility growth, altering traffic signal operations is one of the few efficacious avenues transport planners have at their disposal. Thus, resolving the capacity tension almost always necessitates transport planners reconciling how to operate traffic signals.

Regulation 515, perhaps due to political reasons, lacked stronger commitment at the state level to ensure motorists followed the intent, if not the letter of Regulation 515. From the perspective of RTA staff, allocating road space to move more people instead of vehicles was a reasonable professional decision. From a motorist's perspective, travelling on a tram lane only occupied every 8-15 minutes was a reasonable travel decision. Without stronger state commitment to enforce Regulation 515, RTA and MTA staff concluded driver compliance would likely remain 'voluntary' (Daff & Saggars, 1984). This concern eventuated once the state's campaign ceased; travel patterns along tram corridors returned to their original mobility patterns.

A core piece of technology developed during this period was the Signal Co-ordination of Regional Areas in Melbourne (SCRAM). SCRAM was a new computer system based on the Sydney Co-ordinated Adaptive Traffic System (SCATS) developed to coordinate Sydney's traffic light system. SCRAM was essential to the Fairway programme, since the tram network operated on mixed-modal and along very narrow road corridors. Determining the location of a tram in service required installation of a three-part detection system. Transmitters were mounted on the front of a tram and connected by a radio frequency to underground detection devices at signalised road intersections. SCRAM then coordinated the entire system at the MTA headquarters. The system was both crude in its simplicity and revolutionary in that it prioritised trams through any intersection. Initial testing of SCRAM indicated that it afforded trams greater priority without severe disruptions to car travel (Fox, 1984).

Part-time tram lanes were another critical infrastructure element introduced. The road measure remained the most contentious (and most heavily ignored) by motorists during the five-year rollout of Fairways. RTA studies cited three reasons for poor compliance: 1. lack of understanding towards the measure, 2. reluctance to comply (why should motorists be excluded from a lane absent a tram), and 3. the measure's vulnerability, given heavy reliance on regulations, line marking and signage (RTA, 1985, attachment 3). Whereas transport planners relied on LOS standards based on person throughput to allocate road space, such determinations came into direct opposition with how the general public used, or desired to use, road space.

Figure 6.1: Yellow Fairway lines, photo from author



Perhaps the most defining piece of infrastructure introduced was the yellow Fairway lines (Figure 6.1). These yellow lines provided a simple, noticeable physical method to demarcate tram priority. The role that the lines continue to have in contemporary road space allocation is elaborated later in the chapter.

The MTA eventually rescinded the most contentious road measures such as U-turn and right turn bans across full-time tram lanes and many part-time tram lanes (Sinclair Knight Merz, 2004). State documents published during this time period reflect awareness by state transport planners as to the politics of the Fairway programme. Evidence suggests that politics helped define tram priority as part-time priority tramlines and yellow painted lines. A failure to define tram priority also altered the original Fairway programme design. Transport planners defined priority differently, such as: trams receiving early signalised priority; trams never yielding to a red light; or trams having priority through the use of part-time tram priority lanes. We see later in the chapter that consensus around tram priority has only very recently been achieved.

6.1.2 Tracing how governance intersects with Fairways

Shortly after coming into office in late 1999, the Labor government began work on the state's key policy document *Melbourne 2030* (DoI, 2002). *Melbourne 2030* was intended to solidify a set of high level policy objectives and goals to guide Melbourne's future growth. Following the creation of the Tram 109 department, the state announced the *Think Tram* programme (see Chapter 5). Central to the *Think Tram* programme was the Principle Public Transport Network (PPTN) policy outlined in *Melbourne 2030* (DoI, 2002). Of concern here is the document's discussion of the PPTN. Analysis reveals difficulty in assembling competencies and skills critical to closing the gap between policy development and policy implementation. This in turn speaks to challenges related to adopting a demand stance.

At the time interviews were conducted for this research (i.e. 2011), the two core policy documents guiding the state's wider planning agenda were *Melbourne @ 5 Million* (DPCD, 2008) and the *Victorian Transport Plan* (DOT, 2008b). The clearway controversy had yet to be resolved in the Supreme Court. On the one hand, these high-level state policy documents acknowledged the PPTN's important role in road space allocation. On the other hand, the documents never discussed how clearways, being advanced by VicRoads, aligned with the PPTN, being advanced by DOT.

A senior DPCD decision maker interviewed suggested that transport planners—at least within DPCD—didn't immediately know how to implement the policies outlined in *Melbourne 2030*. For the first three years, *Melbourne 2030* remained largely in the hands of policymakers concerned with collecting more data instead of implementing policy (Participant 20). The DPCD decision maker used the analogy of stopping an ocean liner to describe policy implementation: “you might put on the breaks, but in about three days later the boat might stop” (Participant 20). The analogy's intent was to demonstrate the significant lag between innovation in thinking, and the evidence of such innovative thinking, such as new skills and knowledge. Similar comments were made by multiple, very senior decision makers in local and state government (Participants 20, 23, 42, 43).

Though the ocean liner analogy had its merits, five years had passed between the state's adoption of *Melbourne 2030* as its core policy framework and the interview. As such, the comments therefore further highlight the unknown nature of how constitutive elements intersect through the course of professional practice. For example, one senior DOT decision maker remarked that lag in innovation often stemmed from pragmatic reasons: “already agreed precinct structure plans and subdivisions exist... and developers have the right to build what they're currently building” (Participant 23). This contrasted the “slow and ponderous” policy landscape alluded to in the ocean liner analogy (Participant 20). Whereas one described planning projects already in the pipeline, the other speaks to how *Melbourne 2030* outlined policies that diverged from existing organisational conventions. Thus, as competencies and skills did not exist at the time, “they had to be sought” (Participant 20).

The PPTN policy was first mentioned in *Melbourne 2030* (DoI, 2002). The PPTN was discussed as critical to ensuring stronger integration of Melbourne's multi-modal public transport system “on an area-by-area basis, so that mobility and access, rather than provision of a particular modal service, is the end point” (DoI, 2002, p. 149). The PPTN

was therefore discussed as the way to integrate train, tram and bus modes into a whole system. *Melbourne 2030* acknowledged the need for separate modal plans to develop investment priorities, but discussed the policy as a means to arrange and manage the existing—and future—multi-modal public transport network. Under *Direction 8: Better transport links* in *Melbourne*, the PPTN policy was defined as:

Policy 8.1 Upgrade and develop the Principal Public Transport Network and local public transport services to connect activity centres and link Melbourne to the regional cities (DoI, 2002, p. 145).

Melbourne 2030 outlined several initiatives under Policy 8.1, the first initiative dealt with how the PPTN policy would be implemented and measured.

Initiative 8.1.2 Define and publish targets for public transport service delivery (coverage, frequency and reliability) to be met by the various elements of the public transport system (DoI, 2002, p. 148).

However, Action 1 in the *Implementation Plan* that followed, two months after *Melbourne 2030*, dropped Initiative 8.1.2. In contrast with *Melbourne 2030*, the four tasks assigned to Action 1 (upgrade and develop the PPTN) were to “develop a metropolitan bus plan”, “develop a metropolitan tram plan”, “development a train plan” and “improve ticketing systems” (DSE, 2002, p. 13).

A senior DOT decision maker interviewed who had worked on the PPTN policy, stated the initial perception of senior transport planners within DOI and VicRoads differed. VicRoads staff argued that only one state authority should determine who a ‘priority user’ was, in relation to Melbourne’s road network. DOI staff sought to develop a network of public transport routes that could be integrated with future land use development. At its core, the PPTN policy sought to articulate what transport planning studies continue to advance; integrating land-use and transport infrastructure is a key factor to reducing car-dependent travel. This reflects a desire to transition towards a demand management stance. Importantly, development of the PPTN underscores how infrastructure influences resolution of the capacity tension.

The senior DOT decision maker interviewed summarised the policy’s rationale as engaging the “chicken and egg” dilemma, because where DOI staff desired to put major routes is where the developments are, and where the developments are is where the routes should go” (Participant 49). A long, conflicting body of international analysis

has continued to debate merits of increasing public transport patronage by integrating land use and transport infrastructure (Dieleman & Wegener, 2004; Mees, 2000; Newman & Kenworthy, 1999). The PPTN described a network of public transport routes that DOI staff believed consisted of a “reasonable standard or could be made to be of a reasonable standard if there was sufficient development there” (Participant 49). A secondary but equally important consideration was that once developed, the policy would assist transport planners in making a case for supporting or challenging a particular development approval. It would provide security to declare: “well that's not on the PPTN, therefore it's not desirable from a public transport point of view” (Participant 49). Consequently, infrastructure played a determinate role in transitioning towards a demand management stance. Yet, lack of infrastructure, a legacy stemming from the dominant car paradigm, constrained transitioning towards a demand stance.

The PPTN policy continued to be referred to as a core policy in state land-use policy documents, such as *Melbourne @ 5 Million* (DPCD, 2008), and state transport policy documents such as *Meeting our Transport Challenges* (DoI, 2006) and *Victorian Transport Plan* (DOT, 2008b). However, the high level policy documents never addressed existing governance. VicRoads remains the principle authority charged with allocating space of Melbourne's declared road network. In contrast, DOI and subsequently DOT and PTV are charged with developing policy.

The role that this policy ambit had in road space allocation was identified by several senior level decision makers and transport planners within VicRoads and DOT (Participants 13, 21, 46). Ten years ago, VicRoads staff remained hesitant, if not explicitly against, advancing tram priority projects to the detriment of the car. The hesitation of VicRoads staff stemmed from unknown impacts that such projects might have to Melbourne's road network. To offset potential such concerns, VicRoads staff advocated car infrastructure commensurate with tram priority infrastructure. This resulted in implementing car-specific infrastructure such as constructing an additional lane to ensure car travel was not affected. In contrast, a theme identified in the vast majority of interviews with both state and local transport planners, strongly suggests discussions regarding infrastructure construction and management between different state authorities is in flux.

6.2 How organisational conventions help reconcile the capacity tension

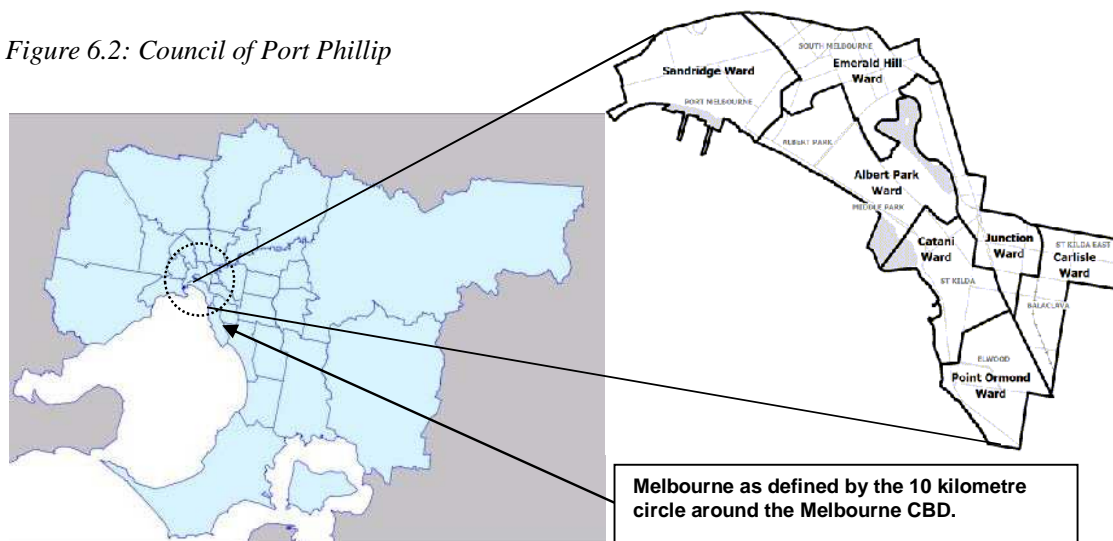
To examine in more detail how infrastructure can both facilitate and impede resolution of the capacity tension, we turn our attention to examining several projects implemented at the local government level. Under the *2004 Road Management Act*, in pure statutory terms, VicRoads is the state road manager. This has continued to result in senior DPCD and DOT decision makers occupying advocacy-type or high level strategic policy roles, but not road management roles. Thus, translation of the PPTN policy into real projects remains tasked to VicRoads. The senior DPCD decision maker's comments presented earlier, suggested that implementing *Melbourne 2030* involved assembling new competencies and skills. In relation to the capacity tension, continued engagement with the PPTN policy can be viewed as generating new skills and knowledge. As we will see, examining more recent tram priority projects and trials shows both evidence of, and impediments to, new transport planning skills and knowledge, both at local and state transport planning levels.

We begin by first examining a 'parking summit' that emerged as the pinnacle to the Port Phillip Councils year-long study and eventual *Parking Plan* (City of Port Phillip, 2001). The *Plan's* success led to subsequent projects and eventually, being approached by VicRoads to trial a new tram stop design. Examining projects that led to the trial, as well as the trial, provide further insight to understand how the intersection of constitutive elements emerges through the course of practitioners conducting their everyday professional duties and responsibilities.

6.2.1 Tracing the creation of tram platform stops

The Port Phillip Council is an inner-urban municipality located south of the Melbourne CBD at the edge of Port Phillip Bay (Figure 6.2). Similar to most inner urban councils, Port Phillip's transport networks are mature and largely developed by the turn of the 20th century. Port Phillip's population in 2000 was roughly 80,000 (City of Port Phillip, 2001). Although Port Phillip had several well patronised tram and bus routes, ABS data showed travel to work was largely done with the car (Smith, 2006).

Figure 6.2: Council of Port Phillip



A conference paper written by a Port Phillip staff member who worked on Council's *Parking Plan* stated that "increasing demand for on-street parking was the trigger for change" (Smith, 2006, p. 4). Interviews with senior Port Phillip transport planners employed during this time indicate that initially, on-street car parking was not perceived as a problem. No significant alterations to Port Phillip's road space had occurred, nor had any significant increase in car ownership. Alterations to road space reflected traditional re-development trends occurring in Melbourne at the time.

From the perspective of Council staff, sufficient space was available on existing roads to accommodate on-street car parking needs. On-street car parking was, therefore, not perceived by council staff as a problem.¹⁵ The problem of on-street car parking was community-defined. Evidence from interviews suggests the discrepancy in views towards on-street car parking stemmed from existing organisational conventions. Multiple surveys conducted by Council staff had continually shown that residents 'perceived' on-street car parking to be a major issue.

Engagement by Council staff with this perceived problem only occurred after organisational restructuring to the Port Phillip Council. The confluence of political and professional leadership changes within council resulted in nurturing a professional environment that "asked for forgiveness rather than approval" (Participants 13 and 15).

¹⁵ Interview participants were asked in at least four different ways, why council finally engaged with the topic of on-street car parking. Interview participants continued to state that at the time, council did not perceive car parking to be a problem.

Thus, new organisational conventions opened opportunities for staff to resolve the capacity tension differently. This in turn allowed for reframing the on-street car parking problem. Instead of resolving parking needs by constructing new parking infrastructure, council staff viewed the issue as an opportunity to have ‘a parking conversation’. As one transport planner stated in interview, “when you talk about car parking, fundamentally you are having a transport conversation” (Participant 15). The conversation began with council manufacturing a fake crisis, suggesting it was considering raising the fee for a third of residential on-street car parking permits to \$1000. The manufactured crisis resulted in engaging the entire community rather than the “odd five people coming along to a community meeting” (Participant 15). This resulted in a four-day ‘parking summit’ in February 2000 (Figure 6.3).¹⁶

Figure 6.3: Parking summit, Port Phillip Parking Plan



The summit included 200 residents, councillors, council staff, and several academic experts such as Peter Newman, Wendy Sarkissian, David Engwicht, Leonie Sandercock and John Friedmann.

Greater participation added legitimacy to reframing the problem, which resulted in exploring new policy avenues. One new policy that emerged was the creation of a mode hierarchy (Figure 6.4). The mode hierarchy provided a foundation for constructing the council’s parking plan, ensured stakeholders understood its core objectives, and could assist in future strategic planning processes (Participant 15).

A new permit zone was also created to regulate residential on-street car parking. Collected fees from the new system were retained into a hypothecated account to fund sustainable transport initiatives.

¹⁶ Figure 6.3 from Port Phillip’s (2001, p. 20) *City of Port Phillip parking plan towards 2010*, and Figure 6.4 from agenda meeting minutes for Port Phillip’s (March 2, 2009, attachment #4) Strategy and policy review committee

Figure 6.4: Port Phillip mode hierarchy

Under the new permit scheme, all new development that only increased dwelling numbers on an already-existing allotment, were no longer entitled to additional on-street parking permits. In addition to the creation of a hypothecated account and new on-street parking scheme, restrictions included in the scheme were incorporated into Section 32 for contracts of sale for new residential homes. The intent was to curtail issues arising from potential home buyers not familiar with the council's parking fee structure.



In summary, examining how transport planners went about resolving on-street parking problems further highlights the unknown outcome for how constitutive elements intersect. Whereas constructing a large off-street car park station would have sent the council down one trajectory, policies enacted sent the council down a different trajectory. At the time of this research, the council was administered under a very different organisational arrangement, and guided by a different set of Councillors and CEO. Yet, policies implemented under the previous administration did help to construct a built fabric that has remained relatively unchanged. This does not suggest subsequent action will or cannot alter road space. Instead, examining the journey from problem-definition to completion of Port Phillip's *Parking Plan*, demonstrates how resolution to one or more tensions is unknown in advance, but emerges through knowledgeable professionals actively allocating road space through the course of their normal everyday professional duties and responsibilities.

Transport planners engaged in the year-long study were found to embody competencies and skills that remain today—even after moving into other professional roles—outside of council. In hindsight, the transport planners acknowledged during interviews that policies generated from the study were the product of a year-long discussion, where council staff talked to (not at) the community. The process was essential to creating a narrative that fostered by-in from multiple stakeholders. It was apparent during the interviews that the process had demonstrated to the transport planners, that having reflective planners, innovative frameworks, time and money are crucial, but “not a panacea” (Participant 13). Change, whether transformational or

incremental, required time to become accepted. In turn, it is crucial “to bring everyone along on the journey, because they’ve got to be part of it, not only to understand it, but also believe it” (Participants 13 and 15).

Council staff viewed the *Parking Plan* as a success, and sought to apply lessons to other areas within council boundaries; such as the Acland Street Shopping Centre project (Acland Street Precinct Association, 2003). Central to the success of the *Acland Street* project was the creation and use of a survey. The survey explicitly linked retail purchases with travel mode. Survey results revealed that an overwhelming majority of commercial revenue came from people arriving by tram or bicycle, not the car. The results surprised most business owners, who had assumed the reverse. The results nurtured support within both council and business circles to re-allocate the narrow space of the Acland Street tram shopping corridor, with the specific aim of affording trams the greatest priority (Acland Street Precinct Association, 2003).

It was during the *Acland Street Project* that several changes occurred at the state government level. The state began work on the planning document *Melbourne 2030* (DoI, 2002). Two years later VicRoads created the Tram 109 department under the *Major Projects* division (VicRoads, 2004). The new department later guided the state government’s *Think Tram* programme, which injected political and financial assistance towards tram priority. The programme targeted three treatment types: 1. on road priority/separation, 2. traffic light cycles, and 3. tram stops (Cliche & Reid, 2007). The programme spurred two additional projects within Port Phillip council: 1. trialling a new tram platform stop, and 2. the *Clarendon Street* tram project.

Compared to the *Acland* project, the *Clarendon* five-month pilot trial was less successful for a variety of reasons. Council and state transport planners took the road measures applied to the *Clarendon* project at face value. Thus, measures trialled in the *Acland Street* project (i.e. hook-turns and parking removal) were applied to the *Clarendon* project without accounting for the project site. Compared to Port Phillip’s *Parking Plan*, in-depth community consultation was not conducted, resulting in significantly more community opposition towards the road measures (Participant 15). The *Clarendon* project, which included removal of 20 on-street car parking spaces, ended with most measures being revoked and parking spaces re-drawn after strong resident and business pressure (Silkstone, June 8, 2005). Failure to get community buy-in along with professionals who didn’t “own the work” provides insight for the *Clarendon* project’s outcome (Participant 15).

The other project that emerged from the creation of the *Think Tram* programme was the development of a new tram platform stop. About 70% of trams continue to operate in street-car conditions (Currie & Smith, 2006). The term ‘street-car’ condition, builds on the legacy of international tram systems found in North America, such as Chicago, New York, Los Angeles and San Francisco, where trams operate in mix-travel conditions (Haldeman, 1916; Storrs, 1927). Scholars classify this condition as the ‘streetcar struggle’ to underscore congestion effects from growing road traffic on tram performance (Currie, et al., 2014). In contemporary practice, the condition differentiates trams that operate in mixed-traffic condition, from light-rail systems that operate in a separated right-of-way (ROW) (Currie & Shalaby, 2007; Currie & Smith, 2006). Separated ROWs are physically distinguishable from other forms of separation, such as painted bicycle lanes. Segregated tram ROWs include grade-separation or dedicated lanes to curtail the mixing of trams and other travel modes.

A central characteristic of the tram system in Melbourne are the over 1,200 kerbside tram stops—unchanged since their construction at the turn of the 20th century. The system requires passengers to interact with motorised vehicular movement when waiting for a tram (Currie & Smith, 2006). To resolve this issue, DOI staff began work on new tram ‘super stops’ (Currie & Smith, 2006). Super stops provide enhanced amenities and are compliant with Disability Discrimination Act (DDA) requirements. A tram super stop is classified as a premium tram stop, and includes design elements such as raised platform stops that are level with contemporary tram doors, larger shelters, and real-time passenger information. These design elements are illustrated in Figure 6.5, taken from DOT’s (2008a, p. 13) Public transport guidelines.

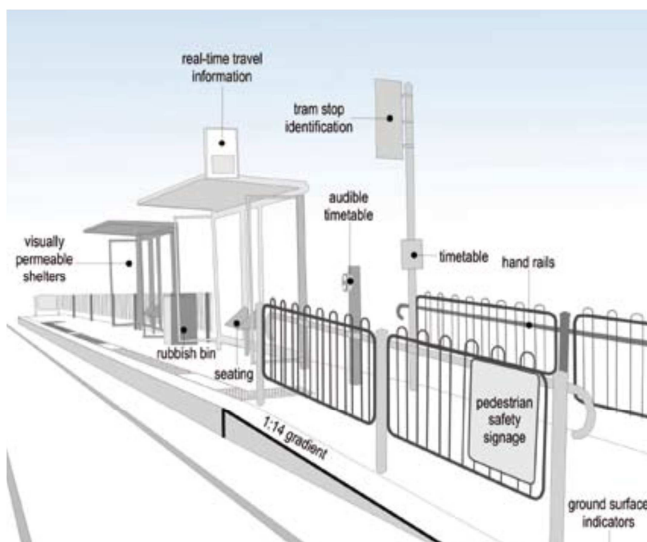
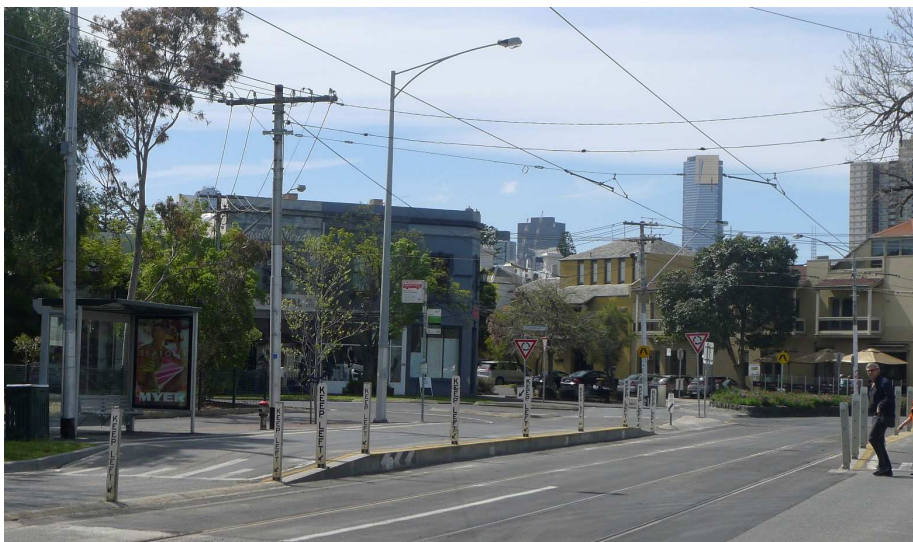


Figure 6.5: Super Stop design, from DOT Public Transport guidelines

Several issues emerged when transport planners began determining how to upgrade the over 1,200 kerbside stops into super stops. Upgrading required reducing the total number of tram stops within the system. This would have a positive result; fewer stops means less stopping and increased average tram speeds. However, each super stop costed around AU\$800,000 (Currie & Smith, 2006). Even only upgrading 1,000 tram stops; such costs were viewed by the state as financially prohibitive. Thus, DOI staff began development on a pseudo-super stop design, later badged 'easy access' stops (Currie & Shalaby, 2007; Currie & Smith, 2006). The term 'easy access' tram stop was created to distinguish it from a super stop. The site for the trial was located along an un-urbanised area in Port Phillip. Since then, other easy access tram stops in more urbanised areas within Port Phillip have been constructed (Figure 6.6). The easy access tram stop design reflects a compromise between passenger and vehicle needs.

Figure 6.6: New tram platform design, photo from author



Comparing the guiding objectives that drove the super stop with those that drove the easy stop brings infrastructure to the fore. In the case of the super stop, objectives were based on designing a stop to meet passenger needs. Thus, amenities included larger shelters and electronic displays. In the case of the easy stop, State officials had tested the design at a local airport to ensure that large vehicles could travel at 30 km/hr over the stop, yet still meet passenger requirements. Thus, the design was based on integrating pedestrian and vehicle needs. Nothing in the design precludes larger shelters or electronic displays. As such, it is apparent that both stopes share more commonalities than differences. Thus, key differences remain with the objectives.

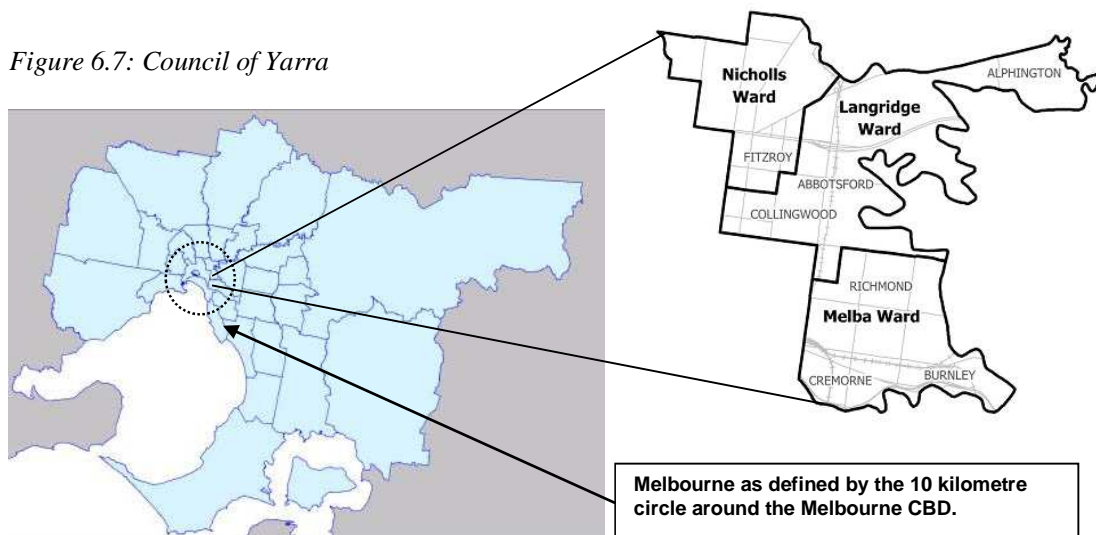
Design guidelines for various tram platform stops were later formalised into a DOT document *Public Transport: Guidelines for Land Use and Development* (DOT, 2008a). The document outlined how to integrate land use and public transport planning across Victoria, thereby giving further support for the PPTN policy. The DOT Secretary at the time, Jim Betts, noted in the forward to the document that although the guidelines outlined addressed process and design standards, they did not establish requirements that could be suitably applied in every circumstance.

Different circumstances were identified by the Secretary as being shaped by different topography or policy statements, which we now turn to examine in more detail. Comparing the construction of an easy stop in Port Phillip, with that constructed in Yarra Council, draws attention to the unknown nature of how constitutive elements intersect during engaging and seeking to resolve one or more tensions.

6.2.2 Tracing how organisational conventions intersect with governance

The Yarra Council is an inner-urban municipality located roughly three kilometres from Melbourne's CBD (Figure 6.7). Similar to Port Phillip, transport networks in Yarra were largely developed by the turn of the 20th century

Figure 6.7: Council of Yarra



In early 2009, the Epworth hospital came to Yarra Council with a redevelopment application (Lahey, April 9, 2009; YCC, 8 April 2009, 22 July 2009). Council conditioned the hospital's redevelopment, based on constructing a DDA compliant tram stop near the hospital. Council was keen to use its influence to get the hospital to pay for a new tram platform stop (Participant 31). As DDA statewide requirements had recently been passed, council staff viewed the redevelopment as an opportunity to get

a new DDA compliant tram stop. Briefly examining how a new tram platform stop was eventually constructed reveals how multiple road space allocation tensions often conspire to shape road space allocation.

Initially, the conditions set by the council were not agreed to by either VicRoads or DOT. DOT's guidelines acknowledged that every project site was shaped by different topography or policy statements. Yet, design problems with the hospital site were too complex and challenging from the perspective of state authorities. As such, there was little reason for the council to place a condition on the hospital upgrade that neither VicRoads nor DOT would sign off. From the perspective of Yarra Councillors, they asked: "if you can't have an accessible tram stop outside a hospital, where can you have it?" (Participant 31).

The conflicting views to the project site reflect a larger theme that emerged from interviews with professional transport planners. Several local government transport planners interviewed alluded to a perception that state and local governments engage road space allocation tensions very differently (Participants 24, 31, 32, and 33). For example, council problems were discussed as often being identified by residents or business owners within council boundaries. The geographical proximity to a respective problem reflected it being "close to home", which subsequently required council staff to "visually go out and see it, rather than just read it on paper" (Participant 31). In contrast, state transport planners were perceived as geographically removed from local issues, and therefore more heavily reliant on organisational conventions and existing transport planning standards and frameworks.

Disagreement between council staff and VicRoads and DOT staff eventually resulted in the hospital's development application going to the Victorian Civil and Administrative Tribunal (VCAT). At the time, VCAT had a long backlog of cases, and thus resolution through VCAT would delay the project's completion. The hospital had been classified as a 'significant state' project, which had allowed it to secure state and federal funding. However, the funding was tied to time-sensitive state and national funding cycles. Thus, any delay might result in the hospital losing its state and federal funding.

Governance, which remains today, empowered the Planning Minister to 'call in' any project deemed to be a state-significant project and be reviewed by state officials. Then acting Planning Minister Justin Madden called in the project. Subsequently, the Planning Minister appointed a senior planner with DPCD to chair a meeting with the different parties involved and report back with a brief. After several meetings, it was

determined to construct a tram stop, as close to as possible, to DDA specifications. Two conditions eventuated from the different meetings. The first was that by January 2011, the hospital would give 10,000 (\$Aus) to DOT to help conduct a feasibility study. Based on the study's recommendations, the second condition stipulated that the hospital would provide a further 10,000 (\$Aus) to VicRoads and DOT to cover more detailed engineering plans of a modified tram stop. Based on the two conditions, construction was to begin within the next five years. Construction began in January 2013 and has since been completed (YCC, 11 January 2013). The stops are not fully DDA compliant (Figures 6.8 and 6.9). The large glass building (red arrow) in Figure 6.9 is the hospital relative to the tram stop (roughly 50 metres).



Figure 6.8: New Bridge Road tram stop, photo from author

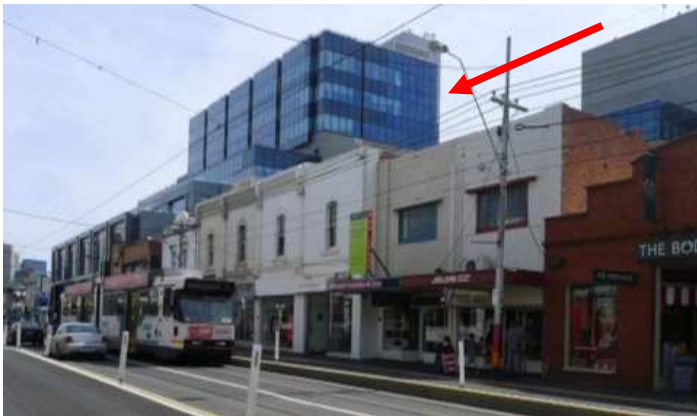


Figure 6.9: Tram stop relative to hospital, photo from author

The final tram stop location and design was the result of a number of meetings between Yarra Council staff, the Bridge Road Traders Association and the Epworth Hospital during the first half of 2011 followed by community consultation during the second half of 2011 (DOT, 28 February 2011). Consequently, the tram platform stop reveals how multiple road space allocation tensions conspire to constrain and constitute transport planning.

Before shifting attention to examining another tram fairway trial, several observations regarding the discussion up to this point can be made in relation to resolution of the capacity tension. Examining the PPTN drew attention to the need for new skills and knowledge to be developed. Continued emphasise by state authorities to implement the PPTN does reflect evidence of greater acceptance of a demand stance. However, questions remain as to the enactment of the stance in professional routines and organisational conventions. Examining projects implemented by Port Phillip council showed that challenges in enacting a demand stance are not limited to state authorities. Comparing the processes used to help construct the tram platform stops in Port Phillip and Yarra Council further highlights the contested nature around adopting a demand stance. Different implementation hurdles were perceived by transport planners in each project. In Port Phillip, the 'unknown' nature of the stop was the major hurdle. In contrast, development of a formalised standard derived from the trial, resulted in the 'perceived limits' of the Bridge Road site being the major hurdle. In both instances, a new tram platform stop was constructed, thereby physically altering the road space.

However, the professional route from trialling to practical enactment of a demand stance in professional routines and organisational conventions is less certain. Thus, questions remain as to whether such material changes alone reflect evidence of adopting a demand stance. Practitioners were forced to enact different professional routines, competences and norms associated with disciplinary training (supported by organisational conventions). Yet, materiality in each case appears to have been insufficient to ingrain such changes more deeply at an organisational level. Consequently, actions and decisions of transport planners were constrained and constituted by organisational conventions and professional norms. Examining even more recent tram priority projects further shows the evolving and contested nature of a demand stance in transport planning for Melbourne.

6.3 Exploring the role of materiality in the capacity tension

VicRoads has continued to pursue different tram pilot projects aimed at providing greater priority for trams. Examples include the *Route 86 Demonstration Project*, the *Route 6 Tram Study* and the *Route 96 Full Tram Priority Trial*.

The *Route 86 Demonstration Project* included redevelopment of a 6.8 kilometre tram corridor (DCC, 2009). The project included constructing a central island tram platform stop, the first of its kind for Melbourne. The project also included tram platform stops similar those constructed along Swanston Street in Melbourne's CBD.

The design affords a shared path for pedestrians and cyclists to interact, but allows for a platform-style tram stop design. The Route 6 Tram Study is an ongoing project that combines Fairways with clearways. Fairway programmes subsequent to the 1980 programme have remained stand-alone programmes. Combining part-time tram priority with clearways reflects new organisational conventions. The study includes technological enhances such as electronic signs and embedded road measures. During clearways, signs blink “tram lane ahead” and “merge left” (Figure 6.10). Embedded road measures consist of blinking lights (Figure 6.11). As Figure 6.11 illustrates, such measures remain insufficient to curtail motorists from parking along the road during clearway hours.

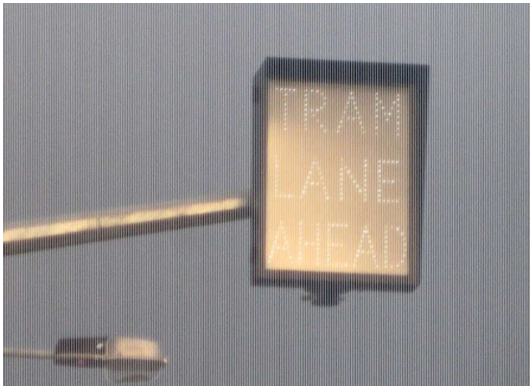


Figure 6.10: New flashing Fairway sign, photo from author

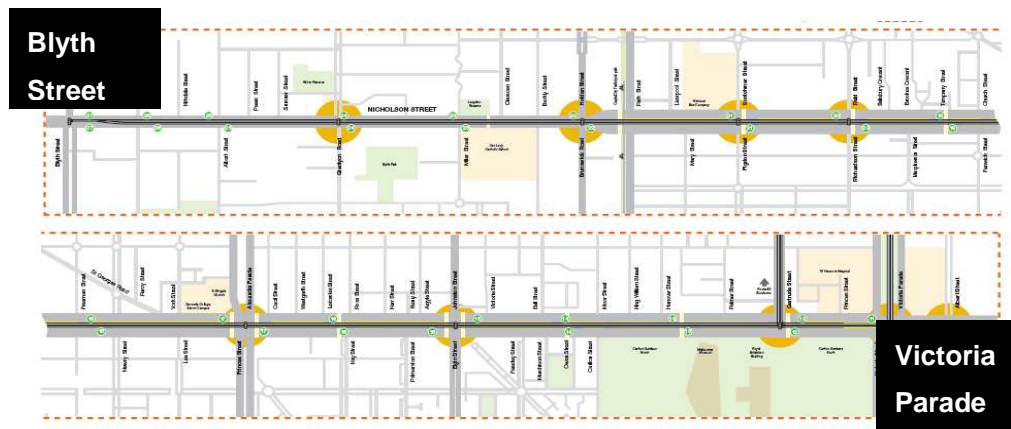


Figure 6.11: New blinking road measures, photo from author

Compared with either the *Route 86 Demonstration Project* or the Route 6 Tram Study, the *Nicholson Street Route 96 Full Tram Priority Trial* provides a tram project worthy of more detailed analysis. The trial project sought to “empirically” test complete 100% priority for the 96 tram (GHD, 2012).

The 96 tram route that runs along Nicholson Street is one of Melbourne's busiest tram routes. 'Full Tram Priority' was defined as ensuring trams were not held up at a red light at nine specific intersections (GHD, 2012, p. 8). The nine intersections included a particular portion of Nicholson Street (Figure 6.12). The trial's goal was to empirically test, in real time, what full time tram priority involved and looked like, and to document side-effects, such as delay to cross-street traffic.

Figure 6.12: Schema of Nicholson Street included in the trial, from GHD report



From preliminary meetings between VicRoads, DOT and Yarra Trams, to conducting the trial, took three years. Community consultation was minimised to ensure the trial occurred in normal travel conditions (GHD, 2012). Preliminary analysis developed a baseline. Pre and post data measured during the trial included tram travel times, queue lengths of cross roads and pedestrian and cyclist data. The trial occurred on 16-17 November 2011 during morning peak travel period (7:30am-10:00am), inner-peak (12:00-2:00pm) and evening peak period (4:00-6:30pm); trams did not run to standard timetables.

The *Nicholson Street Route 96 Full Tram Priority Trial* is notable in that it represents an explicit attempt by senior decision makers and transport planners at state and local governments to discuss and agree upon 'tram priority'. The trial therefore, marks a greater willingness to implement tram priority, and a first for consensus as to the definition of 'tram priority'. However, issues that arose from conducting the trial strongly suggest that such consensus needs to be judiciously pursued.

The final consultant report found that "there is no denying that the trial was restricted by signal and infrastructure parameters, predominantly relating to limitations with software, faults in hardware and inaccuracies associated with stop locations" (GHD, 2012, p. 80). For example, underground detector loop devices relaying a tram's location to the

central tram centre often failed to work every time a tram travelled through an intersection. Issues from the trial were identified in the final consultant report as constituting issues that could be reasonably addressed with new infrastructure—a conclusion corroborated from interviews.

CCTV cameras stationed at each intersection provided a mechanism for transport planners to manually provide priority. Figure 6.13 is a mock-up illustrating the control panel used during the trial. The CCTV cameras were critical in overcoming multiple issues, from malfunctioning underground detection devices to cars turning in front of an on-coming tram.

Figure 6.13: Mock-up of control panel

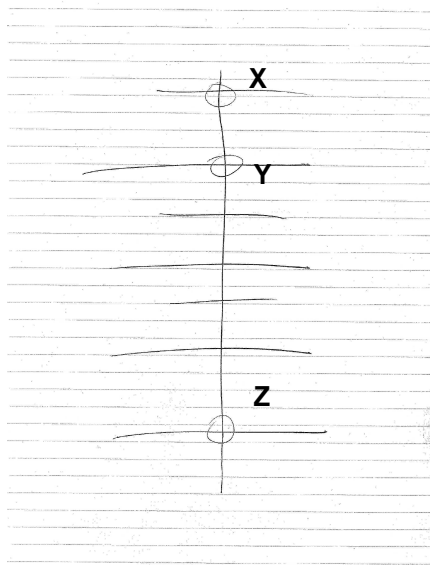


Passengers boarding and alighting trams, reflecting a normal occurrence for tram operations, required extending the green light phase to ensure trams passed through an intersection. Accounting for such mundane aspects of normal tram operations may at face value appear superfluous. Yet, such factors underscore the importance for applying a more fine-grained analysis to road space allocation. Normal everyday transport-related activities such as passengers boarding and alighting directly impacted the trial's results. Further, cars turning in front of oncoming trams required transport planners manually making split-second decisions. This highlights how practitioners actively engaged with technology performing their professional duties (Pickering, 1995). In this instance, it was to resolve another everyday problem of cars turning in front of oncoming trams. The trial also shows how engaging technology helps create, assemble and refine new competencies and knowledge. Examining the recent adoption of a network perspective by VicRoads staff in relation to trial also reveals how knowledge is understood and translated.

VicRoads *Network Operating* division was created to engage road space allocation from a network perspective (elaborated in Chapters 7 and 8). From this perspective, congestion caused from the trial along perpendicular roads that intersected with Nicholson Street were of central concern to VicRoads staff. Vehicles on perpendicular roads were forced to wait for longer time periods as the 96 tram was given priority through an intersection. This generated congestion ripples of varying degrees on the nine perpendicular roads. Whereas some roads were less impacted, other roads experienced significant congestion; to the degree that congestion generated further

impacts to roads significantly further from Nicholson Street. During interview, a *Network Operating* manager made a sketch to represent the impacts from the trial (Figure 6.14).

Figure 6.14: Author's sketch from interview



The circles in the sketch are indicative and helped convey the manager's main points. From a network perspective, leaving these intersections alone would result in negligible impacts to Melbourne's road network. Thus, giving priority on intersections that impacted the network the least would result in X, additional intersections would result in Y, and all nine intersections would be Z.

From a network perspective, providing priority at X and Y intersections would result in negligible impacts to Melbourne's road network. The logic contained in the network perspective appears

sound. But, how determination of X and Y intersections were arrived at are the product of multiple intersecting elements. The trial applied a systematic empirical analysis of tram priority. The trial defined and then measured 100% tram priority. Priority was defined as trams not being held up at a red light at nine specific intersections; an outcome that did not occur each and every time.

The confluence of multiple intersecting factors such as unreliable technology and society impacted the trial reaching 100% priority every time a tram travelled through an intersection. During interview, the *Network Operating* manager acknowledged that such factors shaped the trial's results. But, in its current form the network perspective applied to translate the trial's results remains based on a narrow conceptualisation of mobility. It is important to note that the manager understood many of the limitations with the current network perspective. Thus, on the one hand, issues with the network perspective remain not explicitly with VicRoads transport planners interviewed such as the *Network Operating* manager. Yet, on the other hand, the daily actions, duties and decisions of the manager are shaped by the network perspective in its current form. Thus, regardless to what extent professionals such as the manager understand and attempt to actively redress such limitations, their agency is structured by the narrow conceptualisation of mobility that supports the network perspective; as defined by the dominant car paradigm.

The narrow conceptualisation of mobility has several implications for how road space is allocated in Melbourne. Even if tram priority was provided in the few identified intersections, analysing tram priority a year later would still result in unknown ripples. This helps substantiate the worldview taken in this thesis, which assumes that key to heterogeneity are various inanimate elements (i.e. technology, artefacts, road space) “that directly or indirectly move or block the movement of objects, people and information” (Urry, 2008, p. 50). Accounting for all impacts is an almost impossible challenge, and where the network perspective adopted by VicRoads staff can provide the greatest assistance. Thus, the trial’s results can be viewed in a number of ways.

Tram priority could be applied to a select few intersections. This actually defeats the objective of ‘tram priority’, and might result in increased motorists’ confusion, since motorists would encounter a tram proceeding through an intersection unimpeded only occasionally. Tram priority could be rolled out incrementally. Intersections could be altered at set intervals, based on public campaigns, accumulation of professional knowledge and support at the governing and organisational levels.

In comparison, the trial underscores the inadequacy of implementing tram priority to one tramline. This in turn brings politics to the fore and centre. We saw in Chapter 3 that urban studies have documented that cities such as Zürich have achieved their results through explicitly implementing transit-priority strategies over several decades. The approach adopted in Zürich to manage road traffic volumes is based on large geographic zones (Nash & Sylvia, 2001). When a zone is determined full, traffic lights surrounding the zone curtail further cars entering the zone, until traffic levels are reduced. As one car leaves, another may enter. Although this is a technical problem, it underscores the need for political support to implement such technical determinations, which are in turn the product of different social conventions.

6.4 Chapter summary

This chapter has highlighted re-occurring problem definitions and solutions in transport planning. In particular, uptake of a demand management stance is found to be deeply contingent due to unstable and ever-changing mobility visions developed by different state governments. This provides insight into greater reliance on—though professionally and institutionally bounded—the trend for increasing discretion of transport planners. With respect to understanding how infrastructure influences road space allocation, several important findings can be made.

First, bringing infrastructure to the fore in analysis has revealed several recurring themes crucial to resolution of the capacity tension, particularly the importance of having a unified mobility vision for Melbourne's road network. Further, evidence suggests that adopting a demand management stance results in practitioners embodying crucial knowledge and experience. This in turn helps to create and nurture organisational conventions and professional relationships which are crucial to ingraining a demand stance. And finally, examining how transport planners go about resolving road space allocation tensions has revealed how constitutive elements intersect emerges during the course of allocating road space.

Restructuring of Port Phillip Council altered organisational conventions which afforded opportunities for staff to reframe the on-street car parking problem. Yet, council's *Parking Plan* did not occur in a linear manner with community consultation, policy and then implementation. Instead, practice reflected a recursive process of community consultation, policy development and community consultation. The retraction of professional allowances within council, combined with different organisational conventions held within VicRoads, resulted in the *Clarendon* project having significantly less success compared to the *Acland* project. Thus, organisational conventions both opened and constrained opportunities for staff to resolve the capacity tension. Examining the journey from problem-definition to completion of Port Phillip's *Parking Plan*, shows how constitutive elements intersect is known, but emerges through the course of conducting professional duties.

On the one hand, the *Clarendon* and *Acland* projects can be viewed as examples of 'good' versus 'bad' planning. Leaving aside issues with respect to the problematic term good and bad planning, comparing specific aspects of the two projects does highlight important aspects of each project. The *Clarendon* project was conducted in a shorter timeline and with less attention towards how lessons from the *Acland* project might be applied. Thus, on face value, incorporating these aspects into the *Clarendon* project might have resulted in a different outcome in which business owners were less hostile and more receptive to the road measures put in place. This underscores that no two projects are the same, but it also alludes to a lack of mobility vision at the time, for how to allocate road space at the metropolitan level. On the other hand, comparing the two projects provides a lens to understand the emergent nature of allocating road space. Thus, differences between each project emerged through the course of allocating road space. Comparing the two projects further highlights how greater reliance becomes placed on discretion of transport planners. Though such discretion is professionally

and institutionally bounded, discretion wielded by practitioners comes into conflict with different intersecting elements.

Third, it was shown in Chapters 4 and 5 that politics and legislatively mandated responsibilities constrain and limit how practitioners view and allocate road space. Evidence presented in this chapter substantiates this finding. Analysis of the first Fairway programme indicates governance and uncertainty in defining tram priority both helped to alter the programme's original design. Analysis of subsequent Fairway programmes reveals how lack of hardware (i.e. computer models, funding arrangements) to support software (i.e. organisational conventions, knowledge) provides insight for why professionals must test their ideas. Although continued low funding levels may indicate institutional constraints, the 'tram priority' trial provides a clear example of how engaging the capacity tension requires practitioners to actively engage with technology. Further, the confluence of multiple intersecting factors (e.g. unreliable technology and society) constrained trams being provided 100% priority. As such, we can see that developing new competencies and skills to resolve the capacity tension and transition towards a demand management stance, results in generating unexpected outcomes. In turn, resolution of such unexpected outcomes has been revealed to occur through transport planners actively using, engaging with, and reacting to and against, technology, infrastructure and other inanimate objects.

Fourth, and following on from the third point, several points can be made with respect to different tensions. Both parties generally agreed with applying a demand management stance to resolve the hospital site (capacity tension). VicRoads and DOT transport planners were happy to pursue a DDA compliant tram stop at the Bridge Road site (liveability tension). But, the narrowness of Bridge Road prevented a new tram stop from being DDA compliant (spatial tension). As such, the tram platform stop underscores how resolving one tension often results in unravelling another tension which in turn requires attention.

The professional route from trialling to practical adoption of a demand stance in practice and organisational conventions has been shown in this chapter to be contested and in flux. Thus, the question remains, given that adoption of a demand stance in practice remains contested and in flux, how do transport planners reconcile competing views regarding the best use of road space? Addressing this question involves examining how constitutive road space allocation elements intersect to resolve the liveability tension, which is therefore focus of the next chapter.

Chapter 7 – Hierarchical arrangement of road space

This chapter explores professional norms and conventions that facilitate and constrain road space allocation in Melbourne, Australia. This is third of the four key objectives outlined in Chapter 1. This chapter continues to narrow its analytical gaze to the subject of road space allocation. Whereas Chapter 5 examined norms and conventions in an historical setting, this chapter examines these aspects in more contemporary settings. The trend towards a closer grained analysis taken in this chapter is reflective of the source material discussed in this chapter, which include a variety of original government policy documents, as well as interview material from face-to-face interviews with over 60 practicing and retired transport planners.

We begin by examining the *Hierarchy of Roads* study conducted during the early 1980s. This sets the stage for understanding resolution to the liveability tension, the third of four road space allocation tensions identified in Chapter 2. In summary, the liveability tension relates to the multiple ways that urban space can be understood, engaged with and reacted to or against, or the ‘why’ of road space allocation. Road space provides both communication and transaction needs. Under the dominant car paradigm road space is viewed principally the site for mobility (communication). Consequently, resolving the liveability tension involves determining whether road space will be allocated based on communication, transaction or somewhere in the middle.

We have seen how resolution of the liveability and network tensions rely on road classifications (see Chapter 2 for more detail). In transport planning, such classifications are operationalized through the conventional road classification hierarchy. In particular, operationalization of the hierarchy typology occurs through administrative frameworks and functional processes. Administrative frameworks are formalised procedures used to identify and classify the administrative responsibilities of road space allocation. Functional processes reflect both formal and informal procedures and processes such as the conventional road classification hierarchy, to help apply operational techniques and strategies to facilitate or restrain travel. In Chapter 4, governance for road space allocation was found to be crucially shaped by road classifications. As we see in this chapter, application of the hierarchy typology helps arrange different road classifications into a hierarchical order of importance. This ordering of roads helps resolve the liveability tension.

Examining when strategic processes have been used for different purposes provides insight into the extent professionals build from prior professional studies, as well as support or attempt to destabilise the dominant car paradigm. Attention then shifts to examining how the hierarchy typology has continued to be operationalised to resolve the liveability tension. The discussion provides insight to understand why state policy documents continually fail to build more directly from prior studies and projects.

7.1 Exploring the role of governance in reconciling the liveability tension

7.1.1 The Hierarchy of Roads study

Beginning around 1976 both the RoSTA and the MMBW began examining different road classifications (MMBW, 1979). The intent was to reconcile issues derived from different state authorities using different functional road hierarchy frameworks to allocate road space (Alan M. Voorhees and Partners, 1981).

Table 7.1 compares road management strategies derived from functional road hierarchies classifications used by the RoSTA and the MMBW (Ove Arup Transport Planning, 1980, p. 5). Although a cursory review might conclude both are quite similar, a more critical examination reveals that it was how each authority employed their frameworks that marked the key difference.

Table 7.1: Contrasting road management styles based on road classifications

Road hierarchy		Guiding management objective		Potential managing planning authority	
MMBW	RoSTA	MMBW	RoSTA	MMBW	RoSTA
Freeway	Freeway	Improve efficiency & safety for large traffic movements	Maximise traffic movement	Responsible authority	Primarily state in liaison with local council
Primary arterials	Primary arterials	Improve efficiency of road traffic operation	Facilitate all traffic movement	Responsible authority	Primarily state in liaison with local council
Secondary arterials	Secondary arterials	Accommodate and compromise between traffic & land use functions	Most traffic movement facilitated	Responsible authority	State coordinates, shared responsibility
	Limited arterials		Stabilise traffic volume & land use patterns		Joint & equal state/local responsibility
Collector roads	Local crossing roads	Control of car (particularly speed)	Restraining most through traffic	Responsible authority	Local responsible within state guidelines
Local Access streets	Local streets	Provide access to abutting properties	Maximum restraint to through traffic	Responsible authority	Local responsible within state guidelines

Whereas the MMBW guidelines indicated a single responsible authority, the RoSTA's guidelines indicate a more integrated and joint approach to road space allocation.

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Consequently, the guidelines suggest different avenues for developing consensus to resolving the liveability tension. The different approaches helped to generate momentum for the *Hierarchy of Roads* study. By this point, Buchanan's (MoT, 1964) *Traffic in towns* was well known (Chapter 2). Transport planners noted Buchanan's ideas added further complexity to existing terms such as 'neighbourhood' and 'cohesive area'. However, the study can be viewed as an attempt to more actively engage with such terms (Alan M. Voorhees and Partners, 1981).

The *Hierarchy of Roads* study included a wide range of state and local authorities such as the Ministry of Transport, CRB, RoSTA, RTA, STA, MMBW, local governments and technical working groups.¹⁷ The study aimed to reconcile nine concerns (Pattinson, 1982, p. 248):

- Melbourne Metropolitan Planning Schemes (MMPS) didn't reflect road nuances
- MMPS didn't provide adequate amenity/accessibility balance
- MMPS failed to reflect real-life road space functions
- Local amenity and regional access balance were conducted in ad hoc manner
- Strategies employed by different authorities hampered inter-agency co-operation
- Need for overall metropolitan-wide arterial system for strategic planning purposes
- Need for framework to assist local councils reduce land use and transport conflicts
- Increasing traffic continued to place greater burden on existing road network
- Need to improve public transport and freight movement.

Three larger study aims were developed to address each of the nine concerns. Each aim corresponded with one of three study stages. Stage One was led by MMBW and included a Steering Committee of representatives from local governments and state planning authorities. The stage's aim was to create a new road classification hierarchy as it related to the existing MMPS. Stage Two was led by RoSTA. The aim was to create strategies and decision-frameworks, based on achieving more transparent decisions around allocating road space. Findings of the second stage were documented in the *Metropolitan Bayside Councils Corridor Traffic Study*. Stage Three was led by the Ministry of Transport, and included RoSTA, CRB, the councils of Northcote, Preston and Whittlesea, and assisted by the MMBW. The third stage largely concerned projects identified in the *Northern Corridor Traffic Study* (Loder & Bayly, 1981). The aim was to create a framework to help allocate road space that state and council authorities could jointly own and use. The intent was to determine road

¹⁷ From 1978 to 1988, the project generated over 15 documents (Alan M. Voorhees and Partners, 1978, 1979, 1980, 1981; CRB, 1981; Loder & Bayly, 1980, 1981; Pattinson, 1982).

priorities, based on improving safety and managing traffic on arterial and local roads (Loder & Bayly, 1981). Such concerns go to the heart of the liveability tension.

The *Framework for Conflict Resolution* decision-framework was principally informed and largely created by research conducted by the consultants Loder and Bayly. Figure 7.1, taken from a Loder and Bayly report (1980, p. 22, Appendix D), illustrates the process developed to resolve the liveability tension. Findings from interviews with state transport planners who worked during this time period, suggest that projects completed under Loder and Bayly were innovative and ahead of their time. Evidence from policy analysis does not provide evidence, one way or another, as to the quality or innovative nature of Loder and Bayly's work. What evidence does indicate is that frameworks and strategic processes developed under the *Hierarchy* study failed to be integrated into professional practice and organisational conventions of subsequent state authorities.

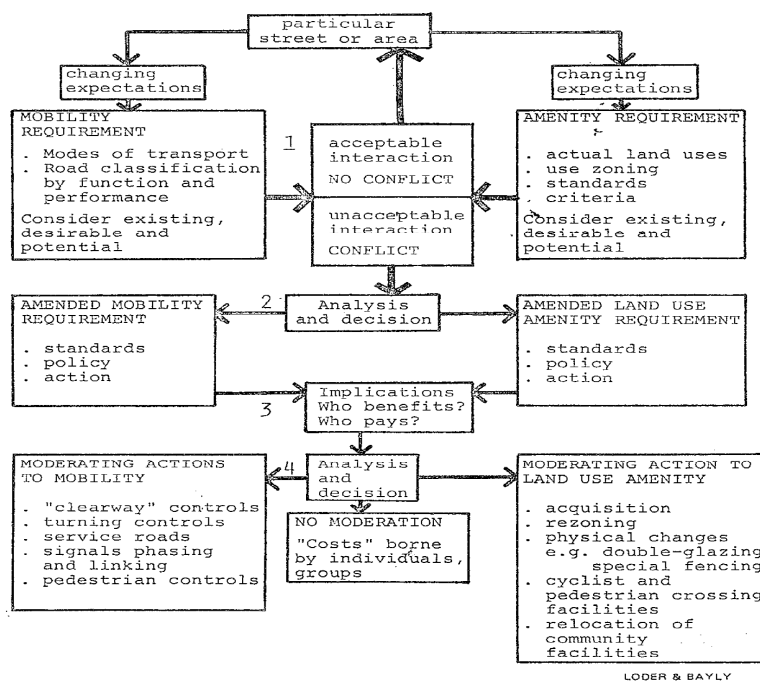


Figure 7.1: Framework for conflict resolution, from Loder & Bayly

The *Bayside Study* developed and refined both the *Road/Amenity Classification* table and the *Framework for Conflict Resolution*. New road/amenity classifications would be generated by working through the framework. The *Framework for Conflict Resolution* consisted of a three-step process based on three criteria:

1. The road hierarchy (created in Stage One)
2. The degree of conflict (defined by a quantitative matrix measuring traffic flow versus residential amenity, crossing expectations, public transport operation and congestion)
3. Government body responsible for management.

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Decisions made as the product of working through the three steps were supported with maps that graphically illustrated two points: 1. conflicts generated from the new road/amenity classifications, and 2. potential implementation strategies. Figures 7.2 and 7.3 are copies of maps generated from the *Northern Corridor Traffic Study* (Loder & Bayly, 1981, Figures 4 and 9). Figure 7.2 represents the road types and degree of conflicts generated from reconciling the liveability tension. The map indicated the degree of conflict between a road's function and other factors such as adjacent land uses.

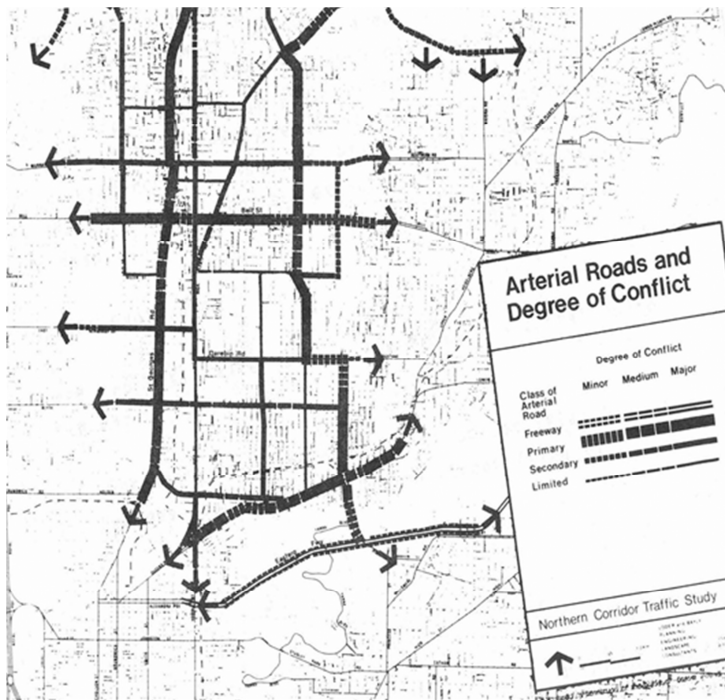


Figure 7.2: Degree of conflict map, NCT study

The map then fed into the implementation programme aimed at either facilitating or restricting different movement (Figure 7.3). The intent was to provide greater transparent policy outcomes, but the maps “did not resolve the conflicts” (Loder & Bayly, 1980, p. 11). The inability to ‘solve’ or ‘resolve’ the conflicts is an important point to make. We see later in this chapter, as well as in Chapter 8, that conflicts stemming from all four road space allocation tensions are socially constructed by definition. Subsequently, resolving such tensions involves professionals making normative decisions based on a variety of factors. As has been made apparent in this thesis, such factors centre on how constitutive elements intersect.

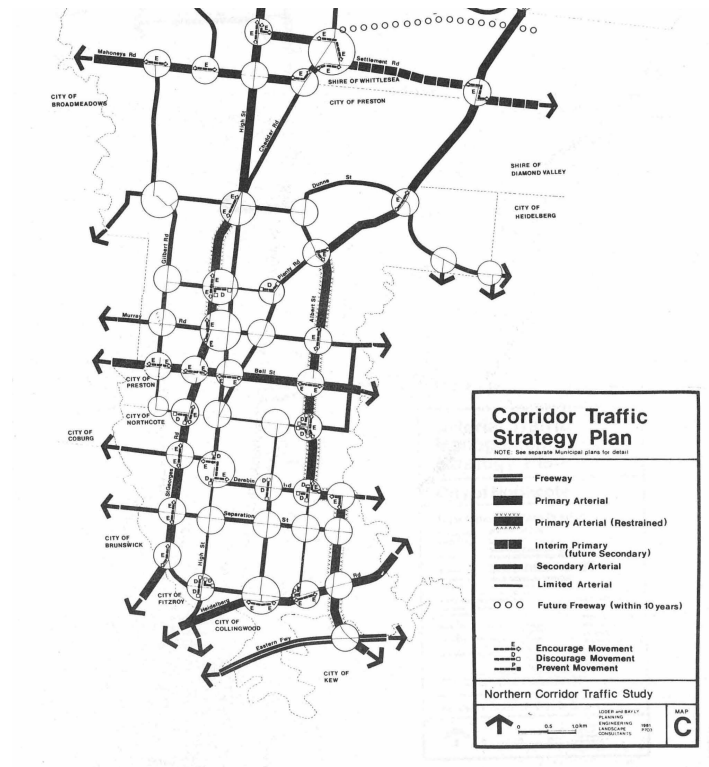


Figure 7.3: Implementation plan, NCT study

In regards to resolving the liveability tension, decision-making frameworks developed by Loder and Bayly required transport planners to be more explicit in how they accounted for, or did not account for, a road's non-mobility functions. It is important to note that though providing greater clarity, such frameworks remained driven by the objective of ensuring efficient car travel. This alludes to issues stemming from the network tension that highlight conflicting needs of local amenity and regional mobility (discussed in detail in Chapter 8).

Analysis of the *Hierarchy* study identified that the *Road/Amenity Classification* table, *Framework for Conflict Resolution* and maps generated from the study were not included in subsequent state policy documents of the time period. For example, while the wider *Hierarchy* study was taking place, the Ministry of Planning published *Shaping Melbourne's Future* (1987), and the Ministry of Transport published *Metropolitan Arterial Road Access Study (METRAS)* (1986). These two documents reflected the government's core policies for urban and transport planning. *Shaping Melbourne* outlined a staged programme to construct "outer ring route connections between various regions of Melbourne" (MPE, 1987, p. 43). METRAS mirrored policy strategies outlined in *Shaping Melbourne*, but also included developing "a metropolitan-wide arterial road strategy", making more "efficient use of the existing network", improving

“tram and bus route management” and providing a more “comprehensive approach to monitoring network performance” (MoT, 1986, pp. 46, 47, 48, 135). Although both documents incorporated the new road classifications created from the *Hierarchy of Roads* study, neither discussed the conflict resolution framework or strategic allocation process. As we see later in the chapter, organisational conventions provide insight into why documents failed to build on processes developed under the *Hierarchy* study.

One of the outcomes from *METRAS* was the *North Fitzroy and Surrounding Areas Traffic Study* (RTA, 1988). The study shared many methodological similarities with the *Bayside* and *Northern Corridor* studies, although neither study was mentioned in either the draft or final *North Fitzroy* study (RTA, 1988; VicRoads, 1989). The *North Fitzroy* study also reveals changes occurring in governance at the time. For example, the final *North Fitzroy* study adopted the preliminary recommendations largely verbatim from the draft report, but replaced RCA and RTA with VicRoads and PTC. How organisational restructuring shapes road space allocation is taken up in more detail in later chapters.

7.1.3 How organisational conventions help resolve the liveability tension

By the end of the 1980s, the *Hierarchy study* had largely been completed. The state government continued to pursue policies outlined in *Shaping Melbourne's Future* and *METRAS*. An examination of *Search Conferences* (discussed in detail below) undertaken by VicRoads during this time period provides insight to understand to what extent organisational conventions within VicRoads were changing. Analysis also shows that the *Search Conferences* were not directly informed by the *Hierarchy* study.

Large organisations such as VicRoads are not monolithic, and in the context of Victoria, such organisations are the product of multiple restructuring stages. The creation of VicRoads in 1989 included staff that had previously approached road space allocation from different perspectives. For instance, the *1983 Transport Act* abolished previous state authorities such as RoSTA (road) and MMTB (public transport), and replaced them with four new authorities: two new road authorities, RCA and RTA, and two public transport authorities, MTA and STA. The *1989 Transport (Amendment) Act*, again restructured the authorities into two new corporatised authorities: VicRoads, charged with all road-related activities, and PTC, charged with public transport-related activities (see Chapter 4 for more detail).

Examining annual reports for VicRoads indicate staff numbers started from 5,590 staff at its inception in 1989, and levelled off to around 3,000 by mid-2000, where they

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remain today. Classifications used to divide staff include five professional groupings: 1. Executive Officers, 2. Engineer/Professional, 3. Administrative, 4. Technical and 5. Field. Dismissing the Administrative and Field categories, the potential number of VicRoads staff involved in road space allocation has remained well over 500 for the past two decades.

From 1990 to 1992, VicRoads staff embarked on a set of '*Search Conferences*'. The goal of *Search Conferences* conducted during this time was to gather a wide range of opinions from professional and non-professional stakeholders, in order to assist the state in developing an arterial road strategy for the next two decades (Andrew O'Brien & Associates, 1990b; VicRoads, 1991a). *Search Conferences* included both one-day events as well as events that extended over several months.

An example of a one-day *Search Conference* is an event that occurred at the newly established VicRoads headquarters in Kew. The workshop was the first time that the general public had been allowed into the headquarters of VicRoads. Almost half of the participants were employees of government departments, with the remainder representing community groups and consultancies (Andrew O'Brien & Associates, 1990b). The consultant's brief for the workshop provided by VicRoads staff, stated that the workshop would "stimulate debate beyond traffic engineering matters" (Andrew O'Brien & Associates, 1990a). The objective was for the consultant's to facilitate a "multi-disciplinary approach to consider the economic, social, environmental and urban form consequences, including the needs of different user groups and conflicts between competing needs" (Andrew O'Brien & Associates, 1990a). As such, the core objective of the one-day *Search Conference* was to consider the different perspectives held by professionals, businesses and general public, in regards to reconciling the liveability tension. To reiterate, road space provides both a route of communication (e.g. motorised and non-motorised travel, a link between multiple place-spaces) and also a site of transaction (e.g. non mobile access, commercial interactions and transactions, embodied place-spaces). Thus, the one-day *Search Conference* sought to determine whether road space should be allocated based on communication, transaction or somewhere in the middle.

The workshop began with a mock play with actors representing Roman Gods such as Rodeometheus (God of Road Planners) and Bicyclops (God of bicyclists) (Figure 7.4). The intent of the mock plays was to dramatically illustrate the contested nature of road space allocation (Sarkissian & Walsh, 1994).



Figure 7.4: Photo of mock play, courtesy of Wendy Sarkissian

The mock play set the scene for the remaining eight break-out sessions of the one-day workshop. Each session divided participants into smaller groups, which would discuss a specific agenda item, and then report back to the larger group. Workshop debrief notes noted that the majority of participants engaged with, and positively viewed, the mock trial's capacity to clearly demonstrate road space allocation tensions. Participant feedback notes also indicate the workshop did not reveal new problems, and that one day was inadequate for developing methods and approaches for reconciling the liveability tension (Andrew O'Brien & Associates, 1990a).

The title of the final consultant report summarises the workshop most succinctly: *Whose Roads?: Allocation of Arterial Road Space in Melbourne* (Andrew O'Brien & Associates, 1990b). The title reflects unresolved tensions and conflicts around who should allocate Melbourne's road network, and by what criteria.

The workshop is also notable for the findings identified by the participants. Summary notes for the first break out session accord with issues contemporary planners still encounter: poor management of parking, need for increased public transport, movement of people versus stationary, a need to distinguish the function and traffic of arterial and residential roads (Andrew O'Brien & Associates, 1990b, Appendix K). Issues identified in each break-out session were tabulated and summarised into a set of larger themes. The core theme that emerged from the wider workshop - as defined by the greatest number of participants - was labelled under the title '*effective use of road space*'. Again, the core theme accords with key policy strategies that transport planners are grappling with in contemporary Victoria: *effective allocation of road space*.

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Participants identified four key points for how the core theme could be achieved (Andrew O'Brien & Associates, 1990b, Appendix L):

- Search for innovative ideas
- Not only what's on road but also what is beside it
- Must develop public transport strategy that supports land use location policy
- Includes well designed road hierarchy

The theme's title, *effective use of road space*, coupled with the four objectives, such as considering road space more broadly to account for *both what's on and adjacent to the road space*, and *well-designed road hierarchy*, clearly demonstrate both stable concerns and conflicts around the liveability tension, as well as stable classifications and processes, that can potentially resolve the liveability tension.

An example of a multi-month *Search Conference* is the *Traffic in Melbourne* (TIM) study (VicRoads, 1991b). The TIM study consisted of a four-phase community consultation process. Each phase involved a one-day workshop over the May to July time period. The major findings from the three month engagement were summarised in a final 12-page Bulletin (VicRoads, 1991a). The Bulletin summarised the core issues identified by participants and described a vision for Melbourne's future road network. The TIM study outlined nine strategies to achieve the vision outlined by the participants, stated below:

Strategy 1 Public transport/multiple-passenger cars travelling to/within city/major regional centres should be given greater priority

Strategy 2 Provide for bus, car and bicycle facilities for non-radial travel

Strategy 3 Improve vehicle environmental performance standards

Strategy 4 Ensure transport agencies are more active in developing planning policies

Strategy 5 Provide a range of regionally and locally based transport services to meet the needs of different parts of the metropolitan area

Strategy 6 Improve safety and Security

Strategy 7 Reduce travel demand

Strategy 8 Improve the efficiency of freight movements

Strategy 9 Make the best use of the transport system we have

Comparing the one-day and TIM study *Search Conferences* highlight stable conflicts perceived by both the general public and professional transport planning circles regarding the liveability tension. The issues accord with those often documented in more contemporary state policy documents. Transport planners during this time period appeared to have had a relatively deep appreciation of the types of road space allocation conflicts, and remained confident that existing processes could reconcile

such conflicts. However, the *Search Conferences* did not build directly on the *Hierarchy* study, per se. Several transport planners that worked on the *Hierarchy* study lead many of the *Search Conferences*. It is logical to assume that embodied knowledge—as was identified with the Port Phillip council transport planners (Chapter 6)—informed how the transport planners conducted these conferences. Thus, a more explicit link between both did not occur (i.e. based on skills, knowledge and strategic processes developed from the *Hierarchy* study, the state sought public input into how to proceed into the future). This lack on continuity between the study and *Search Conferences* is found to be a recurring theme.

7.1.4 How governance impacts resolution of the liveability tension

Under the Kennett Liberal Government elected in 1992, VicRoads organisational conventions were reconfigured to focus on prioritising motorised travel on the declared road network. As such, examining road space allocation under the Kennett Government provides insight for how the liveability tension was resolved—and in many cases remains resolved—through hierarchically arranging road space based on road classifications. For instance, the goal for VicRoads *Road System Management* division, to “contribute to economic and regional development by improving accessibility, reducing travel costs, and providing road users with safe, reliable and efficient conditions”, remained unchanged in Corporate Plans through most of the 1990s.¹⁸ The goal for VicRoads *Traffic and Road Use Management* division, to ensure the “efficient and orderly movement of road users and road freight”, remained similarly stable.¹⁹ The division’s goals never specified reducing car travel, or assisting the PTC in providing greater priority for on-street public transport modes.

The state government’s desire to streamline the public sector resulted in VicRoads restructuring its operations to recognise several new core businesses areas (Natalizio & Siggers, 1998). One outcome from the reforms was the creation of the *Traffic and Road Use Management* division in 1993. Informed by the new political agenda, VicRoads created the *Principal Traffic Routes* programme. The programme was guided and measured by economically-driven outcomes that primarily targeted travel time savings. The term ‘traffic route’ for instance, emphasised road space as the primary defining characteristic or the site of traffic. This mirrored Tripp’s approach to road

¹⁸ (VicRoads, 1994a, p. 16; 1995a, p. 15; 1996a, p. 15; 1998a, p. 22).

¹⁹ (VicRoads, 1994a, p. 19; 1995a, p. 18; 1996a, p. 18).

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space allocation by increasing circulation on certain roads and reducing it on others (see Chapter 2). This viewed road space as primarily the site of movement (i.e. communication).

The programme supported other capital road projects, such as the construction of City Link in early 1993. City Link consisted of a 1.5 billion dollar (\$ Aus.) project, which was almost eight times larger than any of Melbourne's previous road projects (Lay & Daley, 2002). Alongside City Link, the goal of the *Principal Traffic Routes* programme was "to ensure the efficient and orderly movement of road users and road freight" (VicRoads, 1994b, p. 22).

The *Principal Traffic Routes* programme targeted road optimisation. Road measures included both public and private transport but never car disincentives (VicRoads, 1995b, p. 14). The programme targeted key declared arterial roads during weekday business time periods between 7am to 5pm. Road measures included lane configurations, altered intersection and traffic signalling and expanding clearway periods. Focus shifted from prioritising specific elements of road space to traffic flow (McConnell & Somers, 2005). By 1998 the programme covered almost one-third (815 km primary arterial, 210 km secondary arterial and 5 km local roads) of the declared 3,000 kilometre arterial road network (Natalizio & Saggars, 1998). However, the programme's "comprehensive nature and broad aims" involved expensive, time-consuming reports that were cumbersome to VicRoads budgeting frameworks, and it was eventually discontinued (McConnell & Somers, 2005, pp. 104-105).

In contrast with the *Principle Traffic Route* programme, *Shared Space* projects completed during this time in Victoria pursued traffic calming premised on European measures, but with a corridor-level focus (Armstrong, Black, Lukovich, Sheffield, & Westerman, 1992; NSW RTA, 2000; NSW RTA & FORS, 1993). This approach to road space allocation sought to provide a balance between communication and transaction characteristics of road space. Supporting scholarly studies for the projects focused on examining how to adapt bifurcating highways found in rural town centres (Armstrong, et al., 1992). In smaller rural towns, such highways performed the dual function of highway access and access to the main street and activity centre (Brindle, 1997d; O'Brien, 1995). Thus, *Shared Space* projects were concerned with "Type II" roads (NSW RTA & FORS, 1993, p. 7).

According to best-practice *Shared Space* manuals, Type I roads define travel at the primary function, and therefore activities fronting the road are viewed as secondary

considerations. Type III roads define access and activities as the primary function, and therefore mobility needs are viewed as secondary considerations. In contrast, Type II roads reflect road space where the relative importance of both travel and access are equally important, depending on “day, week or year” (NSW RTA & FORS, 1993, p. 7).

Shared Space projects constructed in Victoria during this time period, diverged significantly from the *Principal Traffic Routes* in two important ways. First, road space was understood to have a multitude of travel and non-travel purposes. Thus, this approach reconciled the liveability tension by giving equal consideration to *both what’s on and adjacent to* the road space. Projects constructed in Victoria dealt with road space outside of Melbourne, and were largely introduced as a way to overcome financial hardships from councils and shires unable to construct bypass roads (O'Brien, 1995). One of the earliest trialled projects in Victoria was the rural town of Swan Hill, in the late 1970s (Ellis, 1979). Similar sorts of projects that sought to give equal consideration to communication and transaction were completed to varying degrees by local governments during this time period. A prominent example involved the transformation of Swanston Street, located in the heart of Melbourne’s CBD.

Several events leading up to Swanston Street’s transformation included the introduction of MCC’s *Council Strategy Plan* in 1985 (MCC, 1985a). The core ideas, and majority of work contained in the 1985 Plan were deeply tied with work completed for the 1973 Strategy Plan (Long, 1999; MCC, 1985b). Council’s 1973 *City of Melbourne Strategy Plan* (MCC, 1973) was the product of Interplan a North American Architect firm (Sandercock, 1975). The 1973 Plan divided councillors, upset business interests, and provided additional fuel for state government intervention, which resulted in the sacking of all MCC Councillors in 1981 (Long, 1999). After councillors were reinstated, MCC began work on the 1985 Plan (MCC, 1985b). This plan sought to prioritise natural and man-made environments for people who lived, worked and visited Melbourne, and sought to minimise mobility impacts (MCC, 1985b, p. 226).

Swanston Street was also temporarily closed to celebrate Victoria’s 150th anniversary of statehood (MPE, 1986). During a weekend in February 1985, over 500,000 Melburnians walked on 13,250 square metres of grass adjacent to 15,000 flowers under 240 trees and palms temporarily installed on Swanston Street. Figure 7.5, taken from the cover of MPE’s 1986 annual report, illustrates the material changes that occurred to the street for two days.

Figure 7.5: Closure of Swanston Street, from MPE annual report



By Monday morning, the Street had reverted back to its mobility function. In 1991 MCC recommended a resolution to the state to close Swanston Street to 'motorised traffic'. The following year, aside from emergency vehicles and taxis, cars were no longer allowed to travel Swanston Street (Sharples, 2009). Apart from localised examples such as Swanston Street, VicRoads continued to facilitate motorised travel on Melbourne's declared road network. This highlights the significant impact that governance has on shaping road space allocation. In this case, governance both constrained and assisted MCC staff with reframing Swanston Street as the site for non-mobility activities.

We saw in Chapter 6 that restructuring to the Port Phillip council impacted road space allocation. Similarly, organisational conventions in place helped MCC council staff to reframe Swanston Street as a site for non-car travel. This helped to destabilise the street's primary mobility function. This resulted in prioritising tram, bicycling and walking as the primary forms of mobility. Consequently, resolution of the liveability tension was based on balancing the communication and transaction properties of Swanston Street. At the time of this research, Swanston Street was undergoing an even more dramatic re-allocation of space. We see in the next chapter that the Swanston Street found today, plays an interesting role in road space allocation.

7.2 Exploring more nuanced aspects of the liveability tension

We now examine findings from interviews with retired transport planners previously employed for CRB, RTA, VicRoads and RoSTA, who worked on the projects examined in this study. The professionals were, metaphorically speaking, on the firing lines and at the 'coalface' of transport planning (Hoch, 1994; Lash, 1976). Findings show how organisational conventions impact resolving the liveability tension. This in turn questions more structural issues related to lost individual and collective knowledge and

increased outsourcing of public responsibilities to the private sector, generated from continual organisational restructuring.

7.2.1 How the liveability tension is resolved at the coalface of practice

As elaborated in Chapter 1, professionals are being forced to address profound questions about engaging complex mobility challenges (Evans, et al., 1999). As we have seen in this chapter, resolution of the liveability tension is cyclical in nature. Conflicts inherent in the liveability tension result in resolution based on how constitutive elements intersect. For example, methods and processes developed from the *Hierarchy of Roads* study, Fairway programme or *Search Conferences* were derived from a set of circumstances and contingencies, specific to a time, place and context in Melbourne. The *Hierarchy* study occurred over a few years. The long time frame involved multiple meetings and opportunities for transport planners, from different state authorities, to present their respective work to one another. Transport planners interviewed who worked on the *Hierarchy* study, recalled conflicts between how MMBW, CRB and RoSTA, each approached the study. Work completed by RoSTA staff was found not to directly inform MMBW's work, or vice versa. This resulted in projects often being completed independently.

A senior transport planner for RoSTA recalled when he and a fellow RoSTA colleague presented their work to MMBW. The presentation reflected early conceptual work intended to feed into the first two stages. Staff at MMBW had begun constructing new road classifications, based on traditional classifications, starting at the top with the freeways and then addressing the different classifications. From the perspective of RoSTA staff, the traditional classifications failed to describe the uniqueness of different roads, and therefore staff developed road classifications based on a different aim from that of MMBW. As one interview participant reflected, "a road is not a freeway, and a road is not an arterial" (Participant 58). However, instead of engaging RoSTA's classifications, MMBW remained tied to traditional classifications. During public consultation processes, RoSTA staff also found that their road classifications accorded with how the general public perceived road space. Participants were found to quickly understand the objectives of the *Conflict Resolution* framework. Conversely, more "traditionally trained engineering professionals" were "harder to convert and convince", regardless of whether they were stationed in CRB, MMBW or RoSTA (Participant 58).

Another senior transport planner, who had moved between MMBW, CRB and RoSTA, recalled that work developed under the *Hierarchy* study was innovative for its time

(Participant 61). However, in retrospect, the work was still deeply impacted by organisational conventions that drove the actions and decisions of transport planners, irrespective of it being CRB or RoSTA. The transport planner had continued to occasionally work with VicRoads, recently participating in a workshop where staff from VicRoads and local government developed the council's road management strategy, based on the *SmartRoads* (discussed below and in Chapter 8). This experience demonstrated to the transport planner that though the *Hierarchy* study and *SmartRoads* shared many similarities, a key difference between each centred directly on process and particularly, “in *the way the work was implemented and how it was implemented*” (emphasis from Participant 61).

Whereas previously, staff from CRB or RoSTA often entered a professional or public forum, already “knowing the answer”, irrespective of different viewpoints, VicRoads staff—at least from the retired transport planner’s perspective—now engaged in a process that was more open, transparent, and much more rigorous (Participant 61). Different state authorities therefore resolved the liveability tension by adopting or not adopting certain road space allocation processes (Participants 50, 58, 60). For instance, from the perspective of CRB and MMBW, projects under the *Hierarchy* study were not intended to develop new management styles, organisational conventions, or provide new competencies and skills. CRB and MMBW staff thus chose not to familiarise themselves with more detailed specifics of the study (Participant 58).

When asked in hindsight whether the *Hierarchy* study or *Search Conferences* had shed new information on old issues, or generated new competencies or skills, another retired transport planner (a key coordinator in many of the *Search Conferences*) spoke about the need to differentiate intent. Showing a copy of the TIM study during the interview elicited an unexpected discussion on politics and document titles. More specifically, the interview participant sought to differentiate between a strategy, a plan and a policy and how politics shaped such determinations. Sometimes plans were intended for internal purposes (i.e. to instigate change within an organisation), and sometimes plans were for external purposes (i.e. developing a metropolitan strategy). In the case of the TIM study, the study was an attempt to “get some strategic thinking going on at VicRoads” (Participant 50).

We couldn't do a strategy, so we called it a study. So that's part of politics, strategies come and go in fashion. So at times governments want strategies because they can say this is where we are going. Sometimes they don't want strategies because

there's a real fear.. that strategies mean you're committing money (Participant 50).

The inability to name state policy documents a strategy or a plan, carried over into titles of other studies conducted during the time, such as *Linking Melbourne* and *Freight Initiatives*. Scholars have noted difficulty in identifying and defining policy (Althaus, et al., 2007). Decisions surrounding a document's title shed light on actions that occur away from the public's view and why scholars find difficulty in identifying policy.

At the time of the TIM study, VicRoads had been in operation for less than three years. The merging of CRB and RCA, whose primary objective had been to construct Melbourne's freeway network into VicRoads, was that VicRoads staff inherited powerful and efficient "road-building" organisational conventions (Participant 50). A calculative move was made to engage the TIM study, with the tacit purpose of instigating "cultural change within VicRoads" (Participant 50). It was an attempt by senior VicRoads transport planners, with the express consent and support of very senior VicRoads decision makers, to "broaden the thinking and understanding" within VicRoads regarding transport planning (Participant 50). When asked whether professional and scholarly bodies were aware of when a strategy or study was intended as a policy, or to instil organisational change, the retired transport planner remarked, "no, most of the time, I don't think they are" (Participant 50).

7.2.2 How restructuring impacts resolution of the liveability tension

Insight from interviews with retired transport planners accord with findings identified from currently employed transport planners. The influence of organisational restructuring on road space allocation was identified by many of the retired transport planners (Participants 50, 58, 61). Staff within VicRoads for instance remained unaware of the *Hierarchy* study (Participant 50). The work became absorbed, merged and lost, when RTA was absorbed into VicRoads under the *1989 Transport Act*. From that point on, the aims, objectives and goals of VicRoads shifted, to optimising Melbourne's declared road network and constructing big road projects, with only minimal concern for managing road space (Participant 50).

One senior local government transport planner recited the "significant changes" that have occurred within VicRoads during their 20 years as a professional. 20 years ago, VicRoads was viewed by outside local governments and consultants as "the fountain of all knowledge" (Participant 28). In contrast, the transport planner remarked that over the past decade they have encountered younger and less experienced transport

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planners within VicRoads, and the authority had altered from one of knowledge to approval (Participant 28). From an administrative perspective the arrangement worked fine, but when seeking professional advice, council officers looked to the private sector for guidance, not VicRoads.

Both local and state transport planners recalled a very different period of traffic studies, compared with today. Council officers previously had more direct input into traffic studies. The flexibility afforded staff greater insight into a study's limitations. Studies often consisted primarily of council staff, which fostered opportunities for staff to familiarise themselves with data, and develop and refine professional experience and skills. In contrast, contemporary studies were almost always conducted by external consultants. Transport planners interviewed viewed this arrangement shifted knowledge and expertise into the private sector, and away from the public sector.

Shortly after the release of *Melbourne 2030*, the Department of Premier and Cabinet met with senior VicRoads decision makers, with the direct objective to make headway in implementing the document. Restructuring that occurred in 1996 had shifted strategic planning staff from VicRoads into DOI, which a retired VicRoads CEO now considers “a bad decision” (Participant 47). One could speculate that the move was fruitful, in that it forced transport planners to perhaps engage with different organisational conventions. Findings documented here are conflicting. Irrespective of such conflict, evidence clearly demonstrates that post *Melbourne 2030*, a collective realisation between transport and land use state authorities emerged: road space allocation was best conceptualised, defined and guided by a network orientation. We therefore turn to examine this realisation in more detail.

7.2.3 Emergence of a new approach to resolving the liveability tension?

We have seen in this chapter that resolution of the liveability tension is cyclical in nature. The rise of the network perspective within VicRoads, therefore, is best understood as a reaffirmation of this cyclical nature, as well as seeds for a potentially more robust approach to reconciling the liveability tension; one that can potentially help to destabilise the dominant car paradigm.

The rise of a network perspective within VicRoads can be traced to a variety of supporting sources. Most immediate is the cyclical nature of engaging various road space allocation tensions. We also saw in Chapter 6 how organisational conventions and professional norms respond to changing social conventions around mobility. As

such, the rise of the network perspective can be partly traced to changes within the profession itself. The publication of the World Roads Association-PIARC (2003) *Road Network Operations Handbook*, provides one example of changes occurring within the wider transport planning profession.²⁰

The publication discussed the importance of a network perspective as stemming from 'the Big Shift'. This shift reflected a distinction between an 'Outside-in' and 'Inside-out' view. The Inside-out view emphasises the road user, the Outside-in perspective emphasises management and allocation of road space. Although the publication did not recognise the similarity, in many ways, PIARC's discussion of 'the Big Shift' mirrors the wider UK discussion of 'new realism' (see Chapter 2 for discussion).

The Big Shift... can be described as the shift from road construction to road network optimisation and the shift from road network optimisation to road network user support. Together these shifts can be referred to as a big shift, because they both refer to the change of emphasis from road construction to road network operations, which is a much wider spectrum (World Road Association-PIARC, 2003, section 2.2, page 1).

After the publication of *Melbourne 2030*, the state published *Linking Melbourne* (Dol, 2004a). The updated policy document outlined core goals for curbing growth in car travel. Many senior VicRoads staff viewed PIARC's broad use of the terms 'road user', 'owner' and 'community', as equally problematic as those used in *Linking Melbourne*.

A paper presented at the 2006 Australian Institute of Traffic Planning and Management national conference suggests that senior VicRoads decision makers perceived policy aims outlined in *Linking Melbourne*, dismissed accounting for how Melbourne's road network actually operated (Vincent, 2006). Senior VicRoads decision makers concluded that perhaps it was not possible to cogently articulate how a road network should operate by reference to strategies and goals, unless such actions were applied to roads in their actual operating and land use environment (Vincent, 2006). Although informed by state policy goals, managing Melbourne's road network also involved accounting for often conflicting views of different road users. Reconciling these

²⁰ Started in France in early 1909, the World Roads Association-PIARC is a non-for-profit international association now comprising 118 national road transport planning members from around the world (World Road Association, 2011).

competing needs resulted in the *Network Operating* division being created in VicRoads around 2005.²¹

As we have seen, different state governments and different state authorities have tried to allocate road space based on achieving different objectives. Over time, Melbourne's mobility network has developed which reflects attempts to account for all travel modes, from freight and cars, to pedestrians and bicyclists. The *Network Operating* division was created in VicRoads with the specific goal of determining how to manage Melbourne's mobility needs. The creation of the new division implicitly acknowledged the failure of a predict-and-provide ideology to resolve the capacity tension. Staff within the new division would be more definitive about how roads can and/or should operate. This approach to road space allocation provided a more explicit acceptance within the authority with regard to adopting a demand management stance.

Central to the new division was the creation of Network Operating Plans (NOPs). These plans provide VicRoads staff a way to optimise the declared road network, based on reconciling conflicting state policy goals, and the needs of Melburnians. VicRoads staff identified that *Search Conferences* conducted in the 1990s had found that both practitioners and public viewed road space allocation to be conducted in an adhoc manner (McConnell & Somers, 2005). Findings from interviews indicate that VicRoads staff has only recently become aware of the similarities between the NOPs and decision-making frameworks and strategic processes created from the *Hierarchy* study conducted during the 1980s.

Early prototype NOPs literally involved VicRoads staff drawing coloured lines on a map. As the process has become refined, NOPs were integrated into a computerised format. As the process matured further, a Network Fit Assessment Tool was developed. The Network Fit Assessment tool is a simplified GIS programme that provides a graphical interface to help participants develop an NOP. NOPs have since been badged under the title *SmartRoads* (VicRoads, 2012a).

In summary, staff within the *Network Operating* division of VicRoads had developed a decision-making framework *SmartRoads*. The framework is a “mode-based Hierarchy of Road Use” that helps transport planners determine “how roads will be managed and improved, taking into account the competing demands for space and priority”

²¹ This discussion is supported by findings from interviews with several senior VicRoads managers and decision makers within the *Network Operating* division

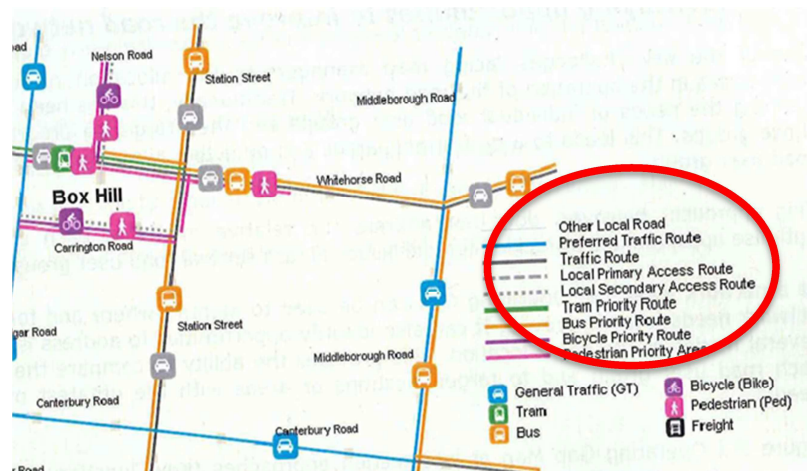
(McConnell & Somers, 2005, p. 99). *SmartRoads* outlines four steps which result in developing a NOP (VicRoads, 2012a):

1. Develop Road Use Hierarchy: to identify the priority of each transport mode by route, place and time
2. Identify operating performance: to enable the network operation performance to be assessed against specific operating objectives, and to identify gaps in network performance
3. Development operating strategies: to define the network level management strategies that are required to support the Network Operating Plan
4. Use the Network Operating Plan

As *SmartRoads* and NOPs are examined in detail in the next chapter, it is worth briefly articulating each of the four steps in some detail, along with the rationale for each step and potential actors and authorities involved in developing an NOP.







In Step One, stakeholders work to develop a Road Use Hierarchy. This in turn helps identify different travel mode priority by route, place and time. Though *SmartRoads* has potential to include the general public, participants currently consist of local and state government professionals. The normative importance placed on route, place and time is determined by a specific road network, generally defined by council boundaries. For example, the category label 'Principle Traffic Route' identifies a key desire line of mobility which may be impacted by and/or come into conflict with, land uses with heavy pedestrian movement. Such concerns go to the heart of resolving the liveability tension. Figure 7.6 illustrates how identification of road classifications (circled in red), arranged according to importance based on the identified Road Use Hierarchy, lead to network operating objectives (Figure 7.6 is from Figure 5-1, VicRoads, 2012a, p. 41).

Figure 7.6: Examples of road classifications, from *SmartRoads* guidelines



Evidence from interviews with *Network Operating* staff in VicRoads suggest determining priority for bus and tram, which fall under the purvey of DOT, are determined prior to developing an NOP based on Principal Public Transport Networks (detailed in Chapter 6). In making determinations around mode priority, a central aim of *SmartRoads* is to expand on traditional transport planning criteria. Figure 7.7 illustrates how *SmartRoads* allows for different interpretations of Level of Service (LOS) from more traditional definitions (Figure 7.7 is from Table 3.3, VicRoads, 2012a, p. 28).

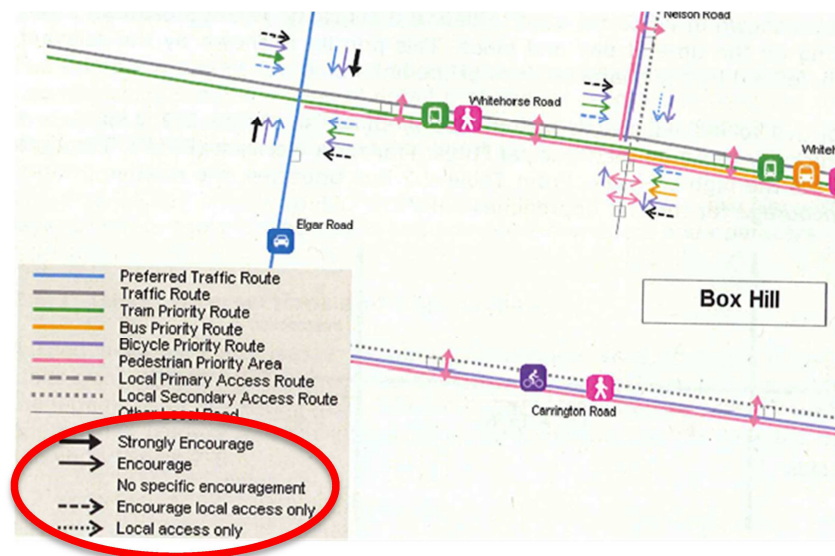
Figure 7.7: Potential new characterisations of LOS, from *SmartRoads* guidelines

reducing performance ↓	Level of Service	 				
	A	No route delay. Always runs to timetable.	Opportunities to cross within 50m. Minimal crossing delay.	High degree of separation. Minimal delay.	No delay. No variability.	No delay. No variability.
	B					
	C	Stop at every set of signals. Within 5 min of timetable.	Crossing within 200m. Average crossing delay is 45 sec.	On-road bicycle lane.	Stop at every set of signals.	Stop at every set of signals.
	D					
	E	Takes at least 3 signal cycles to clear intersection.	Crossing within 400m. Average crossing delay is 90 sec.	Bicycles share traffic lanes.	Takes at least 3 signal cycles to clear intersection.	Takes at least 3 signal cycles to clear intersection.
	F					

In Chapter 5, LOS was defined as volume/capacity ratios that help measure and effectively prioritise speed and unfettered car travel. The normative determination of volume and capacity are value-laden constructs. In Figure 7.6 the normative aspects of the constructs is acknowledged and altered, allowing for the definition of LOS to incorporate qualitatively established operating objectives determined by participants.

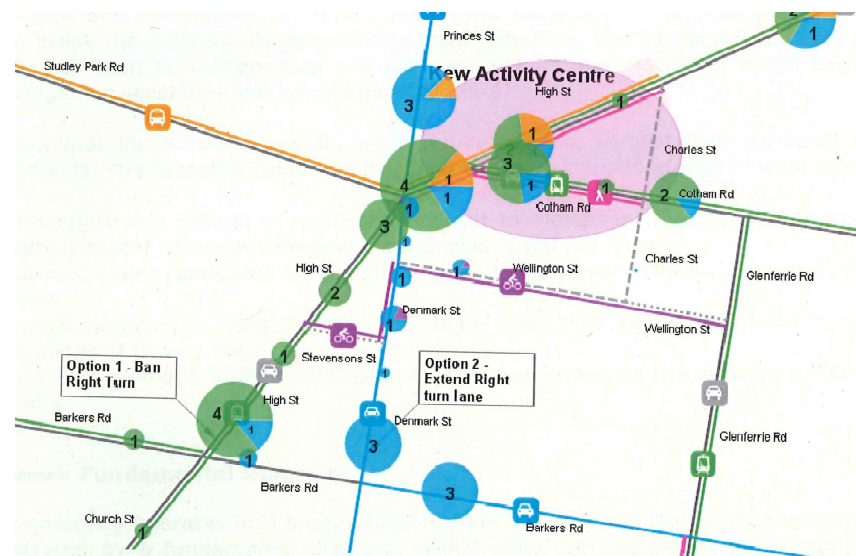
In Step Two, identifying priority of travel modes allows for network operation performance to be assessed against specific operating objectives. Assessing objectives involves weighting the importance of specific road classification categories. For example, the 'Principle Traffic Route' classification indicates peak travel time is weighted higher compared with intersecting roads. Weighting occurs through determining which routes participants would like to encourage mobility or non-mobility functions as defined by different road classifications (circled in red). Figure 7.8 illustrates how VicRoads staff could begin to pinpoint more specific areas of concern to achieve the objectives established (Figure 7.8 is from Figure 2-11, VicRoads, 2012a, p. 26).

Figure 7.8: time-of-day priority, from SmartRoads guidelines



In Step Three, operating objectives help identify gaps in network performance, which in turn help determine operating strategies. Aside from constructing additional road space, altering traffic signalised intersections is one of the few explicit methods that traffic engineers have at their disposal in allocating road space. Figure 7.9 illustrates how specific operating objectives help VicRoads staff identify gaps in network performance (Figure 7.9 is from Figure 3-2, VicRoads, 2012a, p. 35).

Figure 7.9: Illustration of network operating gap, from SmartRoads guidelines



Identifying gaps in the road network's performance in turn helps establish a roadmap for how a road network being examined might operate in the future. As such,

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SmartRoads seeks to provide an avenue to re-allocate road space in a way that gives greater priority to specific modes, at different times of the day, depending on normatively determined road classifications. This results in setting out an aspirational future operation for how a road network in question might be configured.

In Step Four, working through the first three steps results in developing and refining a Network Operating Plan (NOP). An NOP physically and metaphorically reflects a roadmap for how road measures might be implemented, based on the trade-offs and conflicts identified during discussion. NOPs can be altered to accommodate changes to either local or state government policy. The aim of NOPs is to illustrate trade-offs involved when determining mode priority (VicRoads, 2010a, pp. 5-6). In practice, allocating road space is based on achieving the core objective of optimising Melbourne's wider road network.

7.3 Chapter summary

This chapter has revealed how strategic processes and decision-making frameworks frame and limit debate. With respect to understanding how professional norms and conventions facilitate and constrain resolution of the liveability tension, several important findings can be made.

First, there is trend—one could argue, a persistent and deeply-rooted pattern—between road space allocation and the hierarchy typology. We have seen that the hierarchy typology continues to be central to helping professionals resolve the liveability tension. Chapter 2 showed that the hierarchy typology grew from a variety of planning disciplines. Chapters 4 and 5 traced how the hierarchy typology has historically been operationalised in practice and reinforced at the legislative level. This chapter examined how the hierarchy typology is operationalised in strategic processes. Lay (2003) has previously noted that MTPC's *Plan* provided one of the earliest examples of a road hierarchy being applied to plan road space. When taken from a longer historical view, MTPC's 1929 *Plan for General Development*, MTC's 1969 *Transportation Plan*, the *Hierarchy of Roads* study and *SmartRoads*, reflect a deep attachment to the hierarchy typology. Whereas the MTPC's 1929 *Plan* can be viewed as a natural progression from knowledge contained in international publications (see Chapter 2), the *Hierarchy* study built from ideas outlined in Buchanan's 1963 study.

Second, governance is again found to constrain and constitute how transport planners allocate road space. Evidence presented in this chapter indicates that increased

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privatisation significantly impacts a demand stance from becoming embedded in professional routines and organisational conventions. Both local and state transport planners viewed existing governance released knowledgeable public servants from their contracts, which in turn resulted in shifting valuable competencies and expertise into the private sector, and away from public sector. This suggests more structural issues from continual organisational restructuring related to lost knowledge and increased outsourcing of public responsibilities to the private sector. We also saw in Chapter 6 that allocating road space at the metropolitan level was limited by a lacking mobility vision. This chapter demonstrated that the Kennett Liberal Government created a powerful mobility vision, politically and financially supported, to ensure motorised travel was prioritised on Melbourne's declared road network. This suggests that the relationship between state government and state authorities results in cyclical and/or alternating mobility visions.

Third, strategic processes and decision-making frameworks incorporating road classifications and the conventional road classification hierarchy help to resolve the liveability tension to differing degrees. For example, examining the *Hierarchy* study revealed that frameworks and processes did provide improved transparency. The processes did not resolve the liveability tension, but clarified how and therefore helped justify, how decisions were made and toward what purpose. *SmartRoads* highlights yet another attempt to enhance transparency and help practitioners navigate thorny institutional and political issues required to resolve the liveability tension.

The slow diffusion of *SmartRoads* can be attributed in part, to governance and organisational conventions. The process has only more recently been codified in state policy documents and legislation acts (State of Victoria, 2 March 2010; Victorian Government, 2009). At the time this research was undertaken, VicRoads *Network Operating* team was waiting for funds and manpower to conduct more extensive modelling and refine *SmartRoads*. Given the dominate role that VicRoads has in road space allocation identified in Chapter 4, greater uptake of *SmartRoads* has a real potential to resolve the liveability tension as well as other tensions identified in Chapter 2. Consequently, examining *SmartRoads* in more detail can provide insight into how the network tension is resolved, which is therefore the focus of the next chapter.

Chapter 8 – Observing road space allocation

This is the last chapter to analyse road space allocation through empirical data. The objective is to analyse when, why and how a demand management stance has been applied to allocate road space in Melbourne, Australia. This is final of the four key objectives outlined in Chapter 1. Whereas Chapter 6 provided insight to understand uptake of the demand stance (i.e. capacity tension) in relation to infrastructure, this chapter examines uptake of the demand stand in relation to the network tension. Findings presented in this chapter are drawn from a participant observation of a transport planning exercise, continuing a trend to narrow the analytical gaze on road space allocation. In particular, this chapter provides a closer grained analysis of the consequences—for action and the limits of action—with respect to professional capacity and experiences in road space allocation.

The transport planning exercise examined in this chapter covers several Network Operating Plan (NOP) workshops that took place over the course of several months. Background information and data in the form of interviews—both from workshop participants and wider research programme—help set the stage for understanding resolution to the network tension, the final of the four road space allocation tensions identified in Chapter 2. In summary, the network tension draws attention to conflicting local and metropolitan road space needs, or the ‘where’ of road space allocation.

Examining how the network tension is resolved helps to reveal how tacit and embedded knowledge required to turn generic rules and strategies into practice are critical to implementing meaningful and implementable road measures aligned with a demand management stance. The NOP exercise involved five separate workshops. Collectively, the workshops are referred to as the NOP exercise. Each workshop is discussed in relation to one of the four constitutive elements of road space allocation. As detailed in Chapter 3, participant observation occurred only in the last two workshops. The position taken within the two workshops was non-participant.

8.1 *First NOP Workshop*

The first workshop occurred in September 2011. It was attended by senior Council A staff (i.e. Planning Director), four Council A staff (i.e. project and junior managers), and three VicRoads staff (i.e. project and junior managers).

The objective of the first NOP workshop was for Council A staff to reiterate their concerns regarding their inability to pro-actively improve public transport infrastructure and services. The starting point for the NOP exercise stemmed from a letter written by the Council's Director for Planning (Council letter, 17 June 2011). The June letter was a follow-up from a previous meeting between VicRoads and Council's CEO and Director of Infrastructure. In that meeting, Council had discussed their concerns regarding a significant redevelopment projected to occur and identified in the council's recently adopted *Industrial Land Management Strategy*. Several large redevelopment sites were slated to occur along one of Council's two primary road corridors. Development would likely occur in short bursts over a relatively short-time frame. Council wanted to engage *SmartRoads* with the aim of strategically mitigating impacts from the redevelopment. The letter detailed the need to develop "traffic improvements and associated cost estimates" and ensure that Council's "long term strategic planning" could be "effectively undertaken and evaluated" (Council letter, 17 June 2011). Experience had led Council staff to conclude that requiring developers to undertake detailed traffic studies when submitting development proposals for review, could help staff develop stronger business cases to help in legal fights that arose from developers challenging Council in VCAT. Thus, Council A staff sought assistance from VicRoads to pre-empt potential issues related to future development over the next decade, such as increased "rat-running" generated from new developments, which given existing public transport infrastructure, almost certainly would bring increased car traffic.²²

8.1.1 Governance and road space allocation

To place the first NOP workshop in context, we briefly trace aspects of governance of road space allocation. For example, Chapter 4 revealed how rules and politics impact road space allocation. These aspects provided fuel for Council A to participate in the NOP exercise. Yet, as we see later in this chapter, the strong and persistent role that state governments have in road space allocation, compounded by issues stemming from altered state-policy agendas and restructuring of state authorities generated from continual change of state governments, help create a professional setting where local governments question the utility of engaging with processes such as *SmartRoads*.

²² Rat running is a colloquial term. It refers to the practice of motorists driving through principally residential areas and on more quiet residential roads, in order to avoid more congested roads.

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At the time of writing, *SmartRoads* had yet to be formally adopted by all 79 local councils within Victoria. Perhaps even more importantly, *SmartRoads* had yet to become accepted by all senior VicRoads decision makers. Evidence from interviews with transport planners in the key positions of creating, refining and engaging *SmartRoads* indicates that the process has yet to become formalised within VicRoads' organisational conventions. Additionally, road measures identified from the process do not immediately result in such measures being automatically funded.

Measures identified from processes and decision-making frameworks like *SmartRoads* are confined by existing funding arrangements within VicRoads. As such, measures identified require a business to be developed and put forward based on existing Business Area Plans and Work Plans. As the Council A's VicRoads liaison explained during interview, VicRoads Strategic Directions and Annual Business Plans were tied to the state's policy strategies, as well as VicRoads Annual Business Plan. VicRoads currently did not have a "funding bucket for congestion projects... we get funding for road safety projects... and for freight... but congestion-related project were more difficult (Participant 52). The novelty of *SmartRoads* meant it had yet to be mainstreamed within existing business plans. Further, measures most often identified from engaging *SmartRoads* did not reflect traditional measures such as expanding road space, but instead are less obvious, like altering traffic signal operations. Low-cost measures such as altering traffic signal operations (which the VicRoads liaison referred to as a congestion-related project), therefore had to compete with larger, more costly and more traditional transport measures. Consequently, the process provided stakeholders the capacity to develop a set of measures, but remained constrained by established funding channels, premised on a traditional view of transport planning.

The issue of state funding was also raised during interviews with Council A's Director of Planning and Director of Infrastructure. The Director of Infrastructure stated emphatically, "Is there extra money going to be put in to do certain things? No, I know that for a fact. So my view is what is the point of the exercise?" (Participant 59). The Director had been with Council for over 11 years, and therefore the comments reflect agitation in going through different state channels to resolve both simple and more complex road space allocation issues.

8.1.2 Governance and the NOP workshop

Returning back to the first NOP workshop, from an outsider's perspective, it became apparent that as the NOP exercise unfolded the workshop's scope (as detailed in the

June Council letter) would only partly reconcile two competing interests. This finding further supports understanding how constitutive elements intersect emerges from engaging various road space allocation tensions.

The aim of the NOP exercise was not to identify solutions but to obtain consensus between Council and VicRoads regarding the Road Use Hierarchy. The co-presence of senior decision makers helped ensure consensus was reached. The ability of senior decision makers (both within VicRoads and Council) to commit large blocks of time to the NOP exercise was, therefore, critical to ensuring the process succeeded. Yet, Council A staff, particularly senior staff, conveyed a feeling during interview of a need for local governments to be viewed by state authorities as participating in processes such as *SmartRoads* to ensure compliance; and therefore ensure eligibility for state funding. A theme common to interviews with local government transport planners was that not all processes lead to improvement, and instead often reflected more bureaucratic hurdles.

8.2 Second and third NOP workshops

The second NOP workshop occurred a month later in mid-October. It was attended by two senior Council A staff (i.e. Planning and Infrastructure Directors), five Council A staff (i.e. project and junior managers) and five VicRoads staff (i.e. project and junior managers). Aside from a few new participants, all participants from the first meeting participated in the second meeting.

The objective of the second NOP workshop was to provide Council A staff more detailed background information regarding the various aspects of *SmartRoads*. This process was detailed at the end of Chapter 7. In summary, staff within the *Network Operating* division of VicRoads had developed a decision-making framework *SmartRoads*. Information was presented via a PowerPoint presentation by a VicRoads *Network Operating* division manager. The presentation summarised the four-steps of *SmartRoads* (VicRoads, 2012a):

1. Develop Road Use Hierarchy: to identify the priority of each transport mode by route, place and time
2. Identify operating performance: to enable the network operation performance to be assessed against specific operating objectives, and to identify gaps in network performance
3. Development operating strategies: to define the network level management strategies that are required to support the Network Operating Plan
4. Use the Network Operating Plan

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As we saw at the end of Chapter 7, the Road Use Hierarchy helps stakeholders identify different travel mode priority by route, place and time. An NOP physically and metaphorically reflects a roadmap for how road measures might be implemented, based on the trade-offs and conflicts identified during discussion. As the second NOP workshop was principally intended as an information exercise, the meeting ended and participants were asked to return the following month.

The third NOP workshop occurred in November 2011. It was attended by two senior Council A staff (i.e. Planning and Infrastructure Directors), five Council A staff (i.e. project and junior managers), five VicRoads staff (i.e. project and junior managers), one DOT staff (i.e. junior manager), and three local government staff from adjacent councils (i.e. project and junior managers). Aside from new participants, all participants from the first and second meetings participated in the third meeting.

The objective of the third NOP workshop was for participants to begin engaging *SmartRoads*. Participants were divided into three groups to elicit what participants perceived were the primary issues facing the road network within Council A's jurisdictional boundaries. Each group was provided with large laminated maps of the Council A municipality, on which participants could physically mark issues with a felt-tipped marker. The VicRoads *Network Operating* manager made sure participants identified issues, as they related specifically to Council A's road network. Aside from a few small differences, the three groups generally identified identical problem areas and similar concerns. Identified issues centred on peak travel demand routes, and future travel needs generated from projected redevelopment slated to occur within council.

8.2.1 Organisational conventions and road space allocation

To place the second and third NOP workshops in context, we briefly trace aspects of organisational conventions around road space allocation. For example, in Chapters 6 and 7, we saw how uptake and enactment of a demand stance has continued to evolve, yet remains contested. Crucial to uptake of the stance rests on the need to differentiate *developing* professional relationships from *maintaining and nurturing* professional relationships.

Working in large state authorities was identified by many transport planners as problematic. A lacking "front door" into VicRoads, DOT and DPCD was explicitly identified by many transport planners as a major barrier to disseminating and obtaining information and fostering more collaborative work (Participants 14, 40, 46).

State government is so big and the government portfolios are so big, particularly in a department with, well I'll make up a number here, over 1000 or maybe even 1,500 employees. A lot of time is wasted just trying to find out who the right person is to speak with about a particular initiative. And that's two ways: that's outsiders trying to get into the right area within the department to make a decision or give the appropriate advice so that outside area can move forward. That might be, "What do we need to do to develop a bit of surplus railway land?" And they may waste three to six months just trying to find the appropriate area within the Department or the state government, the appropriate area that will make a decision as to whether they can proceed with that sort of thinking or not.... Outside people do acknowledge that, that the Department is a great big behemoth machine. And Public Transport being the biggest part of the Department, I think it accounts for about 400 of whatever the thousand people, is just complicated which is why the current government has been talking about creating a face of Public Transport (Participant 46).

In turn, individuals with multiple-authority experience were found to unintentionally embody a unique communicative role. They became conduits to help a professional in one state authority navigate "big mammoth organisations" to locate an appropriate contact in another state authority (Participants 14 and 46).

Council A's CEO had recently introduced cross-directorates with the specific aim of ensuring cross-pollination of ideas and developing better communication between departments and between staff. To some extent *SmartRoads* mirrors similar changes occurring in professional planning circles more generally. Thus, the process does help with issues associated with cross-state authority collaboration. *SmartRoads* also fills an important transport planning gap in Victoria. Local governments in Victoria are not required by state law to have a local transport planner or professional with transport planning expertise and/or experience on staff. Methods for the telephone survey used to collect this information are detailed in Chapter 3. Of the 12 councils surveyed, only three had a local council transport plan: Council A was not one. The three councils that did have a transport planner on staff also had a transport plan. *SmartRoads* therefore fills an important gap in road space allocation.

Although not explicit, *SmartRoads* also contains the potential to nurture professional relationships between councils and VicRoads, and between VicRoads and other state authorities. Evidence as to whether this objective has been successful is conflicting. For example, when asked whether the process had helped improve the relationship between VicRoads and Council A, the Council's Director of Infrastructure replied that Council has a relatively good relationship with VicRoads, "but we have a lot of

disagreements with VicRoads. We don't necessarily agree with what they tell us; we have issues that have never been resolved" (Participant 59).

Towards the end of the NOP exercise, the role of Council A's VicRoads liaison shifted within VicRoads, resulting in the liaison's position being replaced. The "constant" changing of VicRoads staff was identified by Council A staff as detrimental to building and nurturing relationships. Both Council A Directors cited this as a big issue—one they believed was found with all state planning authorities.

The problem with the (VicRoads office with jurisdictional boundaries containing Council A) is that they are constantly changing their staff. People disappear, come and go. You never quite now; you're dealing with someone on a matter and you're starting to get somewhere, when all of a sudden, the person is off to (another VicRoads office). And then you start again (Participant 59).

Constant organisational restructuring (identified in Chapter 7), along with changing state liaison contacts, were identified as impacting professional relationships, and therefore road space allocation. During an interview with Council A's VicRoads liaison, the transport planner reflected on a previous *SmartRoads* exercise they had participated in with an inner-urban council. Relations between that council and VicRoads had historically been strained; exacerbated by the recent clearway controversy. When asked whether the process had improved relations with the council, the transport planner responded that the process had provided a structured way to come up with both the answer and problem together (Participant 52). VicRoads staff had assumed only a few meetings would be required, but after five meetings, participants remained at odds on several points. The liaison ended up acting as a "relationships manager" between council and VicRoads (Participant 52). The process was further strained by continued absence of key VicRoads staff knowledgeable with council's traffic signal operations.

8.2.2 Organisational conventions and the NOP workshop

Returning back to the second and third NOP workshops, the motivation of Council A staff to engage *SmartRoads* stemmed from a desire to mitigate probable impacts to its road network from projected redevelopment. This motivation was a product of three years of debate, discussion and unanswered enquiries made by Council staff to VicRoads regarding this concern. The delay resulted in Council moving forward with the *Industrial Land Management Strategy*. As such, engagement itself is as important

as engaging road space allocation tensions. This point further supports understanding how road space allocation emerges from the intersection of four constitutive elements.

Council A's Director of Planning and Director of Infrastructure both remarked that the NOP exercise should have been conducted prior to the completion of the *Industrial Land Management Strategy* (Participants 59 and 60). The Council had formalised the Strategy around 2008. Consequently, the capacity of NOP exercise to guide development already in motion was significantly reduced. As one Director remarked, "once you start to change zoning, then the ball is truly rolling... there is an expectation of landowners of certain things" (Participant 60). The Director's remarks highlight two important points. First, timing in road space allocation is critical. Engaging and resolving road space allocation tensions always begins with decisions that have already been signed off and processes already in place. Second, both Directors were adamant about the difficulty to "get the ball rolling", and to engage DOT, VicRoads and DPCD. Evidence regarding this second point is conflicting and less certain. Questions remain if VicRoads had come to council in 2008, whether the Council's *Industrial Land Management Strategy* would have turned out differently.

Transport planners thus engage road space allocation tensions with past decisions, mobility networks and procedures already in place. Evidence from interviews and observing the Council A NOP exercise therefore draws attention to how enactment of a demand stance rests on differentiating *developing* professional relationships from *maintaining and nurturing* professional relationships. In the inner-urban *SmartRoads* example, the VicRoads liaison sought to proactively engage council staff to overcome divergent opinions and develop consensus. In the Council A example, the liaison's relationship with council staff was structured by outside influences, such as being shifted to other areas within VicRoads. During follow-up interviews, Council A staff remarked that the shift had probably contributed to curtailing some of the NOP exercise's momentum (Participant 53 and 54).

Developing professional relationships therefore helps foster agency critical for transport planners to actively make decisions and enact change. Yet, organisational restructuring, conventions and norms constrain *maintaining and nurturing professional relationships*. As such, residue created from resolving past road space allocation tensions impact the level of trust between state and local governments. Ensuring transparent and active processes like *SmartRoads* help eradicate or at least peel back layers of residue, and therefore improve trust. Further, this alludes to how a

professional's capacity to enact change is afforded, constrained and constituted by their professional relationships. To examine this point further, we examine how infrastructure shapes road space allocation.

8.3 Fourth NOP workshop

The fourth NOP workshop occurred in December 2011. It was attended by two senior Council A staff (i.e. Planning and Infrastructure Directors), six Council A staff (i.e. project and junior managers), eight VicRoads staff (i.e. project and junior managers), one DOT staff (i.e. junior manager), and three local government staff from adjacent councils (i.e. project and junior managers). Aside from new participants, participants from the prior three meetings participated in the fourth meeting.

The objective of the fourth NOP workshop was to reach a consensus for Council A's Road Use Hierarchy. It began with reflecting on the draft Road Use Hierarchy developed during the previous meeting. The VicRoads *Network Operating* manager referred to the draft NOP as a "living document" (notes from observation). As a means to generate consensus on the Council's Road Use Hierarchy and NOP, VicRoads staff provided a demonstration of the Network Fit Assessment Tool. Since mid-2000, VicRoads staff has refined a Network Fit Assessment Tool to visually demonstrate trade-offs made during discussion with stakeholders engaged with *SmartRoads*. The Tool provides VicRoads staff a critical mechanism to help develop an NOP. As revealed later, the Tool not only helped drive the conversation of the NOP exercise, but actively engaging the Tool also resulted in influencing and shaping the actions and decisions of actors.

8.3.1 Infrastructure and road space allocation

To place the fourth NOP workshop in context, we briefly trace aspects of infrastructure and road space allocation. For example, in Chapter 7, it was mentioned that the Swanston Street found in Melbourne today plays an interesting role in road space allocation. At the time of this research, Swanston Street was undergoing further material alterations which will result in making most forms of motorised travel difficult if not impossible. Specifically, every tram stop along the street within the immediate Melbourne CBD was being upgraded to reflect DDA compliant tram platform stops discussed in Chapter 7. The design affords a shared path for pedestrians and cyclists to interact, but allows for a platform-style tram stop design.

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Lessons applied to Swanston Street were integrated into the *Route 86 Demonstration Project* (see Chapter 6 for more detail). During an interview with a junior DOT manager, the transport planner remarked that the *Route 86 Project* provided a real example that “catches everyone’s imagination... an allegory” for how road space can be re-allocated (Participant 11). But, when asked whether other road corridors within Melbourne might eventually transition towards a Swanston Street configuration, the transport planner was hesitant. This hesitation was identified in multiple interviews with both local and state transport planners (Participants 4, 14, 21, 23, 26, 31 and 34). In some cases, transport planners perceived some road corridors could eventually such a transition. In other cases, such transitions were couched within the current transport planning conditions of Melbourne. For example, a senior VicRoads decision maker remarked that their explicit professional role was to balance impacts such as curtailing car travel along a specific corridor in relation to Melbourne's wider road network.

If we ban traffic on the road, they are going to go to another road in the short term. If that has an adverse impact on the network... freight movement, etc: our role here is to work out a balance. We know we want, we want to head to a point where we want less cars and more public transport. But it can't happen overnight, so we need to head down there (Participant 21).

Although the *Route 86 Project* might reflect an allegory for how to resolve road space allocation tensions such as liveability, Swanston Street’s transformation appears an allegory current transport planning conditions of Melbourne have yet to accept. The implication of Swanston Street is important for understanding how infrastructure shapes road space allocation. It was made clear during interviews that Swanston Street is a material reminder of what past local and state transport planners defined as appropriate use and allocation of road space. It is the obdurate nature of such infrastructure treatments which provides a critical pivot point. We have seen that whereas a clearway can be quickly implemented and unimplemented, in the case of Swanston Street, infrastructure treatments are the product of months and sometimes years, of debate, discussion, planning and eventually funding and construction. Thus, Swanston Street acts as a material reminder of the time and manpower involved in road space allocation.

Such material reminders often come into conflict with altered mobility visions as the result to change of state government. We have seen how state government political agendas come to shape longer-term mobility visions. The relationship between state government and state authorities result in cyclical and/or alternating mobility visions

(see Chapter 7). Making rules to manage Melbourne's road network involves developing consensus around a vision. Yet, garnering support around a vision also involves reaching consensus around a problem. Remarks from a junior DOT manager allude to difficulties in reaching consensus around both a vision and a problem.

In my mind, it's a no-brainer: you manage the signals so that 80% of the time is given to trams so they don't get delayed at all. But in reality it doesn't work like that, because no one's making up, no one's prescribing those rules with respect to how we manage the network, because it's just too hard (Participant 46).

The transport planner had recently shifted roles, moving from VicRoads to DOT, and was intimately familiar with *SmartRoads*. From their perspective, questions remained regarding who exactly should decide whether one car trip through an intersection, containing often less than two passengers, was more or less valuable than a tram trip, often containing 50 or more passengers. Determining these normative trade-offs is where "the hard decisions will have to be made, and no one's talking about that" (Participant 46). We saw in Chapter 6 that such decisions have required repeated resolving since the 1950s. The state government in power at the time that this research was conducted had signalled that whenever possible, road space should be allocated to facilitate passenger throughput, not vehicle throughput. The transport planner remarked that this is clearly where *SmartRoads* provided for the greatest input. Yet, an absent mobility vision to prescribe rules for allocating road space was identified by the transport planner as a glaring gap.

Though developing consensus and support for a vision was acknowledged by almost every transport planner interviewed (inclusive of NOP exercise), what was not always acknowledged was that garnering support for a vision also involves reaching consensus around a problem. This discrepancy can be partly traced to differences in professional disciplines as well as wider disagreement in transport planning more generally. For example, many transport planners defined and spoke about road congestion in vastly different ways. Conflicting views toward congestion accord with unresolved debates within urban studies regarding defining congestion, travel time savings and induced demand (Goodwin, 1996, 2006; Metz, 2008; Mogridge, 1997; Mokhtarian & Chen, 2004). Transport planners employed within DOT or DPCD often remarked that "congestions can be viewed as a solution, and/or a very effective form of demand management" (Participants 3, 8, 11). Conversely, VicRoads staff often differentiated between solving and managing congestion; and looked to school holiday periods as a valid year-round benchmark (Participants 16, 21, 23 and 26). Over the

past few years, VicRoads staff had documented roughly a 5% reduction in the 12 million vehicles driving roads during the school holiday period. Bringing “traffic congestion down to the school holiday times” was viewed as many VicRoads staff interviewed as a way to manage, not solve, road congestion (Participant 26).

When allocating road space from a network perspective, transport planners face an additional challenge of unknown consequences, in that altering operation to one part of the network impacts the wider network differently (a point identified in Chapter 6). The challenge makes developing consensus around problem setting, or garnering support for a unified vision, even more challenging. Although evidence does suggest that transport planners are willing to engage with unknown consequences, a lack of consensus around how best to apply a network perspective to allocate road space clearly impacts resolution of the network tension.

8.3.2 Infrastructure and the NOP workshop

Returning back to the fourth NOP workshop, the exercise provides a case to further trace the contours of materiality. Whereas Chapter 6 focused more on infrastructure-specific aspects of materiality, attention here turns to understanding how technology shapes the decisions and actions of actors.

By its very nature, *SmartRoads* views road space allocation from a network perspective, which remains its core strength. Yet, *SmartRoads* has yet to adequately account for how society, technology and science intersect. For example, during an interview, a VicRoads *Network Operating* manager acknowledged the conflicting intersection of how decisions are influenced by politics, funding arrangements, and social norms around travel and road space use.

[I]f we want a culture change, we've got to manage the network now with the view to the future, and aggressively move towards that. And that becomes a change, because it can't be done now. If you were to say: put some bus lanes down on every route across Melbourne, it won't mean that we're going to solve congestion, people don't have the mindset of taking public transport (Participant 26).

Although *SmartRoads* provides transport planners with a transparent process to help resolve the network tension, resolution still requires making normative decisions and determinations. Understanding how such determinations are made requires examining how actors respond to and against technology through the course of their daily professional duties.

The Network Fit Assessment Tool was used during the NOP exercise to facilitate and drive the wider discussion. Importantly, though professional skills and tacit knowledge held by workshop participants clearly attributed to successful consensus around the NOP, prescribing such agency to actors is insufficient for understanding how the actions and decisions of transport planners are constrained and constituted. The Tool provided VicRoads staff a mechanism to physically represent participant's concerns and to simplify what otherwise would have been a conversation of complex terms and concepts. This involves participants identifying how roads 'currently' function, and then envisions how they 'could' function in the future. Decisions are based on importance of a road corridor and travel mode priority. For instance, cars are provided greater priority during peak travel periods and less priority during off-peak periods. The temporal aspect provides a way to develop consensus around issues that fundamentally can never be 'solved'.

Returning to the issue of operating traffic signalised intersections, a key feature of the Network Fit Assessment Tool is its ability to demonstrate how different travel modes could receive priority, based on decisions made. Given that the real time nature of the discussion, fictitious yet 'reasonably assumed' data, as defined by experience and knowledge held by workshop participants, feed into the Tool to illustrate how roads could potentially operate, based on data and mode priority determined by participants. Note that this does not suggest a promise of funding to alter such traffic signals. Nor more importantly, does this suggest that physically altering such traffic signals will result in the presumed outcome that mobility will magically orchestrate according to the newly altered operations of the traffic signals. What the Tool did (not what the actors did), was help participants understand how the Council's road network currently operated (given the fictitious data imputed) compared to how the network could potential operate in the future.

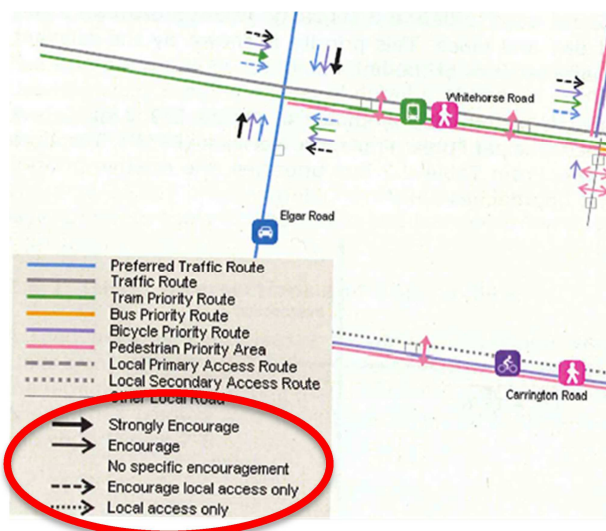
Figures 8.1 and 8.2 are copies of figures from Chapter 7. They are drawn from the draft *SmartRoads* guidelines, but represent similar examples used during the NOP exercise. Figure 8.1 illustrates how arranging road classifications according to importance, in accordance with the developed Road Use Hierarchy, lead to network operating objectives. Identifying priority of travel modes based on road classifications allows for network operation performance to be assessed against specific operating objectives. Figure 8.2 illustrates how this involves assessing objectives by weighting the importance of specific road classification categories (circled in red).

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Figure 8.1: Examples of road classifications, from SmartRoads guidelines



Figure 8.2: Time-of-day priority, from SmartRoads guidelines



Several participants questioned the rationale behind the different designated labels assigned to the Road Use Hierarchy. For example, a road that currently functioned as a main traffic route for motorised travel is classified as a 'Principal Traffic Route'. Many participants demonstrated concern regarding this classification, since Council A staff mention council had only two primary roads which currently carried the bulk of current travel. Both roads were parallel to one another, and both "would still carry the same level of traffic, regardless of designation" (notes from observation).

VicRoads staff made clear to Council A staff very early on in the NOP exercise that the key objective was to develop a Road Use Hierarchy for council. Forcing Council A staff to choose only one of the two parallel main roads as a Principal Traffic Route, was an attempt by VicRoads staff to help identify how to shift resources, for example, changing traffic signals. Evidence clearly suggests that although such measures might be

identified, funding such measures is less certain. Therefore, hesitation towards identifying only one Principal Traffic Route on the part of some of the participants might stem from several reasons: awareness of the political and financial realities; acknowledgement that regardless of designation, motorists will use road space however they see fit; or failure to understand the NOP as a long-term strategic document. Evidence from personal observation and interviews is conflicting regarding why some participants failed to pick one Principal Traffic Route.

The Network Fitness Assessment Tool provides a mechanism for developing a base case in which to model current mobility patterns within a specified road network. Local knowledge held by participants (both council and VicRoads) helped input numbers into the Tool to illustrate its operational capabilities. The importance that professional knowledge has in resolving road space allocation tensions has been noted in Chapters 6 and 7. In the NOP exercise, many Council A transport planners identified the metropolitan view held by VicRoads staff. Thus, to get the local knowledge held by council staff involved VicRoads staff physically travelling to council. As one Council A staff remarked, “not that they do it all the time, but they are starting to” (Participant 54).

Eliciting knowledge helped participants engage with *SmartRoads*. This point implicitly makes sense at face value, as actively requesting participants for their knowledge will likely result in enhanced participation. Yet, eliciting such knowledge also assisted VicRoads’ cause to quickly compile a ‘probable’ base case scenario. This in turn helped to demonstrate the Tool’s usefulness, support the rationale for engaging *SmartRoads*, and further legitimised the notion of local knowledge.

On the one hand, engaging the Tool helped move the discussion forward, keeping participants focused on the process’ main objectives. On the other hand, this legitimised local knowledge as useful and accurate, regardless of any normative influences underpinning such knowledge. For example, ‘problem sites’ identified by NOP exercise participants often centred on what transport planners “believed”, “had witnessed first-hand”, “knew of” and had “read from a consultant report” or “public letters from angry residents about specific trouble spots” (notes from observation). Local knowledge was not contained to council staff, but included participants who lived near Council A, or who had extensive personal experience as a pedestrian, driving council streets, or even walking their dog. For example, when discussing “short-cuts” from Council A to an adjacent council, participants (both council and VicRoads) spoke about how they themselves travelled through the council area. Thus, pedestrian and

bicycling concerns were spoken of as if the participants themselves had partaken in such activities. Given that very few if any regularly travelled by foot, bicycle or bus, such local knowledge can be viewed as both useful and potentially problematic.

Compared with other NOP exercises, the NOP exercise that took place at Council A encompassed the entire municipality. Whereas prior exercises often focused on a road corridor, inclusion of the entire municipality made a more detailed traffic analysis difficult. To save money and time, VicRoads staff looked to Council staff to identify problem sites worthy of more detailed traffic analysis. The workshop closed by Council staff providing VicRoads staff with several key trouble sites, principally defined by issues generated from freight travel or peak road congestion. VicRoads staff noted down the areas, and mentioned that before the follow-up meeting, Council should circulate the list to workshop participants for completeness.

8.4 *Final NOP workshop*

As the fourth workshop occurred just prior to the Christmas/New Year holidays, the fifth and final meeting did not occur until February 2012 (two months after the fourth workshop). The final NOP workshop was attended by one senior Council A staff (i.e. Infrastructure Director), two Council A staff (i.e. project and junior managers) and two VicRoads staff (i.e. project and junior managers). Aside from one new participant from VicRoads, participants from prior workshops participated in the final NOP workshop.

The objective of the fifth NOP workshop was principally a data gathering exercise. The workshop began where the last workshop had stopped, with VicRoads staff again asking for trouble sites.

8.4.1 *Transport planners and road space allocation*

To place the fifth NOP workshop in context, we briefly trace aspects of transport planning and road space allocation. In Chapter 5, we saw how the clearway controversy generated a type of residue from reconciliation of differing road space allocation tensions. In Chapter 6, enactment of a demand stance was found to have evolved, yet remains contested and in flux. Pertinent to the contested nature of a demand stance, made clearer from observing the NOP exercise, was the role of professional disciplines.

Like so many aspects of planning more generally, road space allocation is argumentative by its very nature. The ordinary actions of transport planners therefore

have “subtle communicative effects” (Forester, 1989, p. 138). Observing practitioners in their professional work settings in real time, coupled with findings from interviews, provide insight into understanding how specific disciplines inform the types of ordinary professional actions signalled by Forester. Consequently, focusing attention on residue generated from prior resolutions of road space allocation tensions and the role disciplines have in road space allocation, help reveal more stable aspects of transport planning in general, and how road space is allocated in particular.

SmartRoads makes more explicit both tacit knowledge and normative decisions. This is an important point to clarify, as different disciplines inform what is considered an appropriate normative aim. Professionals with a university degree in a specific discipline, for example, now carry knowledge, skills, methods and concepts unique to the discipline, which has since been refined beginning around the 1950s (Hamnett, 1999). Though “anecdotal and empirical evidence” suggest a growing recognition that land use and transportation be presented at the university level in an integrated manner (Krizek & Levinson, 2005, p. 315), studies of university curriculum document that depending on country, some universities have made further advances in curriculum than other universities (Akbar & Rasul, 2012).

Topics such as communication and programme evaluation, particularly with a focus on economic, physical and social activities remain core issues for transport planners with a planning education in North America (Edwards & Bates, 2011) and Australia (Stiftel, 2009). A statement in interview from a junior DPCD transport planning manager epitomised an urban planning perspective: “If you start from the pedestrian you’ll get it right” (Participant 14). Such statements were often presented as a counter perspective to what one senior DPCD decision maker referred to as “the god of flow”.

Well my big bone of contention is that, when I started this thing, most large road agencies in government have one God that they bow to, and that is flow. Kings must be kept flowing, the God of Flow we called it. And it is the God of Flow that gets challenged because while there's a probably a moderately sound abstraction of principle there, it has to encounter all sorts of circumstances and flow doesn't always win (Participant 20).

The god of flow reflects a focus on peak travel and measured success by travel-time savings. Again, such concerns remain the heart of the dominant car paradigm. As the DPCD transport planner remarked, “saving people two minutes sometimes isn't always the best thing in the world to do” (Participant 20).

Transport planning concerns related to traffic flow, road capacity and signalised intersections remain core subjects in traffic engineering education in North America (Zhou & Schweitzer, 2009) and Australia (Mateo-Babiano & Burke, 2013). The importance of such concerns is reflected in professional roles and job descriptions. A discussion of new residential subdivisions by a junior VicRoads manager underscores conflicts that can arise during the course of daily professional duties. Whereas ‘urban planners’ often focus on density and walkability, ‘traffic engineers’ focus on spacing of road intersections for car storage queues at a traffic light. Thus, professional conversations traverse from very high level strategic debates around “broad subdivision of land”, to minute and detailed technical debates around how a specific traffic light will operate. As the transport planner stated, “it’s quite challenging” (Participant 16).

Evidence from the wider thesis strongly suggests that contrasting views and approaches to road space allocation cannot be boiled down to two disciplines or an either-or scenario. Depending on professional experience, transport planners interviewed had, over the course of their professional experience, both encountered and accumulated knowledge associated with specific disciplines. Thus, evidence clearly indicates that not all traffic engineers think one way, nor do all urban planners think another way. What the evidence from participant observation, interviews and policy analysis strongly indicates however, is that organisational conventions, unique to specific authorities, and constraints related to position description, professional duties and workplans, combine to reinforce specific educational background held by practitioners. As a senior VicRoads decision maker in the *Network Operating* division of VicRoads observed during interview, it is the combination of these three that has consequences.

In discussing issues related to innovation, the decision maker remarked that from their experience, a “small percentage of people in the workforce” can be classified as “innovators”—professionals capable of grabbing an “idea and running with it” (Participant 21). The remark is interesting when contrasted against a theme that emerged from interviews: traffic engineering is a four-year degree in problem solving. Although knowledge, skills and solutions for designing a bridge have largely been solved, applying a network perspective to road space allocation is new. Thus, whereas transport planners in Melbourne have had significantly more experience in reconciling the liveability tension, contemporary mobility challenges had brought the need to resolve the network tension to the fore. The senior decision maker remarked that

developing new practical knowledge grounded in everyday practice required to resolve the network tension is challenging. As such, traffic engineers today are “effectively creating... a whole new manual for how you manage” road space (Participant 21). The decision maker was quick to point out that not everyone in VicRoads (evidence clearly indicates issue not specific to VicRoads) is up to this challenge.

Though traffic engineering was perceived by many interviewees as a degree in problem solving, questions remain as to how comfortable traffic engineers are in the emerging field of demand management. The relationship between disciplines and normative decisions was also identified in the second clearway controversy. Table 8.1 compares and contrasts the views of transport planners regarding the clearway controversy. Of the total 61 transport planners interviewed, 46 can be correlated directly to the clearway controversy, of which over half tentatively supported the clearways, but believed its benefits had been constrained by poor implementation.

Table 8.1: Transport planning views towards clearways and road space

CLEARWAYS	Opposed	6	13%
	Poorly Implemented (tentative support with improved measurement, data collection, community consultation, multi-road measures)	27	59%
	Agreed	13	28%
ROAD SPACE	Link (Efficient people movement at network level)	16	35%
	Depends (Road specific, tendency to look at larger regional transport needs)	23	50%
	Place (Proactively reduce travel / travel remains localised)	7	15%

Two points were most identified by transport planners as to why Clearways were poorly implemented: 1. there was a failure to implement the Clearways in conjunction with other measures, and 2. Clearways were implemented in a top-down manner, which failed to take into account local knowledge—specifically a road's context between different councils. Although most transport planners interviewed acknowledged merit in applying incentives and disincentives, most acknowledged that the state government was not actively pursuing push–pull policies together (see Chapters 1 and 2).

The tentative viewpoints identified in Table 8.1 are further interesting when compared to professional viewpoints towards the most appropriate use of road space. The overwhelming majority who responded that road space is a place (liveability tension) worked in local government. The classification can be traced to a variety of influencing

factors, such as professional background, but also to professional client. An overwhelming theme that emerged from interviews was the context-dependent nature of a client. Whereas state transport planners most often viewed their client broadly, local government transport planners often classified their client by their municipal boundaries. Transport planners tying the context to a project, concluded project hurdles differed from project to project (Participants 13, 15, 21 and 25).

Regardless of whether a client was tied to government or project, evidence supports the need to foster ownership during a project (see Chapter 6). Fostering ownership helps overcome residue generated from resolution of tensions from prior engagement. For example, Chapter 6 examined issues from constructing a new tram platform design. Interviews with several Yarra councillors also identified issues related to a perception that VicRoads staff applied the Road Use Hierarchy in contradictory ways. For many councillors at Yarra Council, engaging *SmartRoads* revealed that the Road Use Hierarchy classified many road corridors within the municipality as pedestrian, cycling and public transport priority areas. Councillors felt that these identifications were of secondary importance to the intent of moving cars during peak travel times. It was made crystal clear during interviews with Yarra Council councillors, that irrespective of how *SmartRoads* did or did not account for more sustainable modes of travel, views held by councillors toward *SmartRoads* were coloured by prior engagement with differing road space allocation tensions; in particular resolving the liveability tension with regard to clearways.

Local government councillors are not transport planners by training. A core role of councillors is to mediate between their constituents and respective council staff. Whereas transport planners may or may not be aware of how politics shapes road space allocation, politics remains the core landscape in which councillors make decisions. Thus, councillors perceived the clearway controversy as evidence that VicRoads was a 'car-oriented organisation'. Irrespective of the validity of this perception, it validated existing beliefs and assumptions. This in turn coloured already heated negotiations surrounding clearways, and subsequently hampered uptake of unrelated VicRoads projects, such as tram priority trials being pursued by VicRoads staff. Consequently, residue generated from the clearway controversy resulted in influencing how different VicRoads divisions, not charged with clearways, garnered local government political support for tram priority.

In contrast to findings from interviews with local government councillors and transport planners, interviews with transport planners at the state level perceived the clearway controversy as the product of misunderstandings and local parochial interests. State transport planners questioned a narrow local government lens to engage road space allocation challenges. Findings from participant observation and from interviews indicate local transport planners' bias towards local issues. This partly accounts for why local transport planners perceive road space as a place (Table 8.1). This finding should be tempered. We saw in Chapter 5 that parochial interests are also the result of governance (i.e. state is responsible for declared roads and local councils for non-declared roads). Thus, findings present a more nuanced picture of road space allocation than 'parochial local perspectives' and 'VicRoads is a car-oriented authority'.

8.4.2 Transport planners and the NOP workshop

Returning back to the fifth NOP workshop, as the objective of the fifth NOP workshop was principally a data gathering exercise, the workshop concluded with no mention of a follow-up meeting to formalise the larger workshop. Several months passed after the final meeting with no indication of closure to the NOP workshop. It was later discovered during this study that change of government had resulted in temporally placing the workshop on hold. Over the next few months, periodic enquiries were made by the researcher. Council A's VicRoads liaison moved into a new role within VicRoads, which made enquires more challenging. In early August, an enquiry revealed that as far as VicRoads was concerned, the NOP workshop had been completed, and Council's NOP had been finalised.

At the time of the follow-up interviews, although some transport planners could recall having seen a formalised NOP, no final meeting had been scheduled to signal the end of the workshop. From the perspectives of many of the participants, most were not aware that a formalised NOP had been signed off. Given that every Council staff member involved in the NOP exercise had emphasised the importance of closure, and the need to develop an implementation plan, the absence of both appear disconcerting. From Director down to staff, council staff remained adamant about the need to develop a finalised council NOP, and linking it to an implementation strategy.

During the first round of interviews with NOP exercise participants, a Council A transport planner clearly stated that they expected the process to provide Council with "a plan of action that explains where everything goes" (Participant 54). During follow-up interviews, the same transport planner relayed a story of how they had just recently

reviewed a consultant's traffic report. The report summarised the traffic modelling results detailing projected traffic and travel patterns from a large development slated to begin construction within the year. The report concluded that the majority of new travel would be confined to existing roads in Council A. The transport planner 'knew full well' that that would not be the outcome (Participant 54). A finalised council NOP, connected to an implementation plan, could have provided valuable evidence to engage the report in a more critical manner. In contrast, the transport planner reflected on an outcome that favoured the interests of the developer instead of council.

Due to circumstances (detailed in Chapter 3), interviews with Council A's Planning and Infrastructure Directors only occurred once, during follow-up interviews with other Council A staff who had participated in the NOP exercise. During the interview, both conveyed a feeling of having spent the greater part of their tenure at Council, repeatedly relaying the same issues to different state authorities. Council had made clear to VicRoads over the past three years what senior staff believed were the most pressing issues facing Council. Yet, both remained hesitant as to the application of *SmartRoads* for outer-local governments.

If there was shortfall in my mind, which is a big issue for this municipality; and I think this is what happens when you have a programme that was developed and it was very much geared towards inner-city, places like Port Phillip, where there are trains, buses and trams and all that sort of stuff. Here, we have some of those elements, but we don't have all of them. And we also have a very key issue, and that is freight. And, when you put that into the mix, then all of a sudden the model that you are using, which is linked directly to Activity Centres, is all of a sudden very different. What happens in this municipality is when freight moves across roads, and because we only have three key spots, those spots close up. Everything closes off, everyone stops. So no matter what've done either side of the line, no one moves anywhere (Participant 60).

For outer-urban local municipalities such as Council A, infrastructure provision and consequently mobility patterns remain significantly different to that of inner-urban municipalities. The two Directors acknowledged that *SmartRoads* had "identified things" and that the "process was good" (Participants 59 and 60). This reflected the strength of the process, since not identifying such issues would have signified serious problems with the process. However, the process was perceived as yet another bureaucratic hurdle. The Directors felt they first had to "exhaust all avenues", before going back and saying to state authorities, "we've gone through the processes; you need to give us something else" (Participants 59 and 60). Additionally, both remained

cautious as to the utility of *SmartRoads* for outer-urban councils. Given previous studies specifically target such outer-urban areas as facing the largest difficulties in transitioning towards a sustainable mobility future, such concerns are problematic (see Chapters 1 and 3). Though not definitive, evidence from this thesis suggests that such concerns reflect both the novelty of *SmartRoads* as well as issues associated with teething and which can be more readily resolved through continued refinement.

Up to this point, transport planners have been identified in relationship to road space allocation. To conclude our discussion, we re-orient and highlight professional disciplinary background. During follow-up interviews with two Council A NOP exercise participants (referred here by pseudonyms, Dean and Paula), Dean spoke positively about *SmartRoads* (Participant 54). In contrast, the process had instilled in Paula the wider benefits of adopting network principles, but not the certainty that the process would/could curtail car-reliant development (Participant 53). Neither Dean nor Paula questioned the validity of *SmartRoads*—an important distinction as the process resolves, but not solves, the network tension.

With 40 years of professional engineering experience in the private and public sectors, the last 10 years in his current role with Council, Dean brings a vast body of knowledge and experience to Council A. Dean therefore might be categorised as a true engineer, in the sense that he was educated as an engineer, first applied his engineering skills and knowledge to road construction projects, and then became knowledgeable with traffic engineering after shifting into the local government sector. Conversely, with 16 years cumulative professional experience, the past six years acting in her current position with Council, Paula might be considered a true planner, by both education and profession. Paula completed her undergraduate planning degree, and then moved into the local government sector, working for both urban and rural councils, before settling at Council A. Although working in both statutory and strategic planning, Paula's primary professional experience is with strategic long-term planning.

From his professional [traffic engineering] perspective, Dean believed *SmartRoads* made sense, in that it had “put all the different pieces on the plate.... And when you think like an engineer, you try to think logically” and the process reflected a logical approach (Participant 54). Conversely, from her professional [strategic planning] perspective, Paula remained uncertain as to whether the process could help curtail car-reliant development. As she remarked, “I’m not sure how it’s going to work. I understand how it will work - I just don’t if it can do that” (Participant 53).

8.5 Chapter summary

This chapter has analysed when, why and how a demand management stance has been applied to allocate road space in Melbourne, Australia. In seeking to accomplish this objective, the chapter provided a closer grained analysis of the consequences—for action and the limits of action—with respect to professional capacity and experiences in road space allocation. In doing so, several important findings can be made which relate specifically to the objective of this chapter, but which also substantiate findings identified in other chapters.

First, the rationale for conducting participant observations is to demystify road space allocation. Seemingly detailed aspects of the NOP exercise may initially appear unrelated to road space allocation. Yet, fine-grained analysis help construct a richer and more complex picture of transport planning than that revealed in more traditional accounts of transport planning practice. Importantly, paying particular attention to the mundane activities of professional daily work helps reveal the contours of material agency. For example, the meeting room where the NOP exercise largely (though not exclusively) took place consisted of a large well-lit room with a large table in the middle of the room. The table was roughly three to four metres in length and one metre in width and could seat about 20 individuals. The Network Fit Assessment Tool consisted was projected onto a large screen at the end of the meeting room. The Tool resembled commonly used computer programs such as 'Google Maps'. Engaging the Tool required VicRoads staff, stationed at the meeting table with the other participants, to tap commands into a laptop, which in turn resulted in lines being drawn onto the projected map. Making changes to the map was slow and time-consuming, requiring a minute or more of lag time to update new data. The lag time slowed the workshop's progress and weakened participant's enthusiasm. The breaks (morning tea and lunch) literally injected sugar and a newfound sense of energy and urgency into discussions. This conceptualisation of professional practice underscores the importance of understanding how road space allocation emerges from the intersection of four constitutive elements. As such, the NOP exercise involved professionals sitting around a table, debating and clarifying concerns, and painstakingly applying concepts to a projected map of roads—the same roads located outside of the meeting room.

Second, in relation to the network tension, this chapter revealed how resolution was shaped by the dominance of specific disciplines found in transport planning. The claim that disciplines such as traffic engineering provide the only explanation for the identified

divergent perspectives towards road space allocation is not suggested. What the evidence from participant observation and interviews does strongly indicate however, is the need to distinguish dominance in disciplinary criteria applied in strategic processes such as those found in *SmartRoads*, from dominant disciplines in practice.

Third, how determinations are made through the course of daily professional duties involves understanding how actors respond to and against technology. Although *SmartRoads* provides transport planners with a transparent process to help resolve the network tension, resolution still requires making normative decisions. The Network Fit Assessment Tool played a central role in help to make such normative decisions. Though professional skills and tacit knowledge held by workshop participants clearly attributed to successful consensus around the NOP, prescribing such agency to actors is insufficient for understanding how the actions and decisions of transport planners are constrained and constituted. As such, a more concise representation and accounting for how and why the constituted elements intersected in the manner they did during the NOP exercise, involves tracing the contours of materiality. The Tool provided participants a means to develop a base case to model current mobility patterns of the council's road network. More specifically, it projected a map of the same roads directly outside the meeting room. As such, the Tool provided a means to generate consensus. Yet, the Tool also acted as a mechanism to illustrate ideas, concerns, arguments and solutions as understood and conveyed by actors. Consequently, successful resolution to the network tension via *SmartRoads* occurs from knowledgeable actors reacting to and against, the Tool.

Fourth, evidence presented in this chapter clearly indicates politics and legislatively mandated responsibilities constrain and limit how practitioners view and allocate road space. In Chapter 6, lack of political support was found to alter the original Fairway programme. Findings from interviews presented in this chapter indicate that professionals generally acknowledge merit in applying *both* incentives and disincentives, but state political priorities had yet to support packaging an integrated push-pull policy agenda. Evidence presented in this chapter substantiates that existing governance is insufficient to reconcile conflicting local and metropolitan road space needs. Examining the NOP exercise revealed that the aim to test-drive *SmartRoads* was not made explicitly clear by VicRoads staff to Council participants, and therefore, generated expectations which were different to those held by Council participants. Similar to process analysed in Chapter 7 that emerged during the 1980s

and 1990s, *SmartRoads* has yet to be formally integrated into VicRoads organisational conventions and business funding models.

A willingness by transport planners to engage road space allocation tensions was clearly identified. This willingness, however, does not directly result in successful resolution to road space allocation for several reasons. Lack of political support and a metropolitan-level mobility vision, coupled with governance and organisational conventions, almost always resulted in transport planners applying simplistic stand-alone road measures. It is for this reason that *SmartRoads* is critical. The process makes tacit knowledge more explicit, and explicitly reveals the normative aspects of road space allocation. *SmartRoads* is perceived by professionals as a positive and useful technique. Even if the process doesn't generate 'the answer', it affords multiple stakeholders to identify and agree on a set of principles to begin engaging road space allocation challenges. Evidence to this point is very clear, though *SmartRoads* does not solve road space allocation tensions, it provides a transparent process to develop consensus around engaging and thus reconciling such tensions.

Chapter 9 – Advancing our understanding of road space allocation

This study asked: *What can the practice of road space allocation tell us about the significant determinates that constrain and constitute transport planning in transitioning towards a non-car paradigm of professional practice?* Answering this question has generated several findings, and provided new knowledge to our understanding of how professional transport planning practice is constrained and constituted.

The conceptual framework developed in Chapter 2 analysed road space allocation as emerging from the intersection of transport planning, governance, organisational convention and infrastructure. Examining how road space allocation tensions of liveability, spatiality, capacity and network were resolved, helped to construct a richer and more complex picture of transport planning practice.

Road space allocation has therefore provided a useful exploratory research topic to account for and in turn examine the science of transport planning. As we have seen through the course of empirical analysis, paying particular attention to the mundane activities of professional transport planning revealed the contours of material agency. Actors were forced to engage, react to and against, technology and infrastructure, which in turn, shaped their actions and decisions.

The empirical analysis also provided insight into how different road space allocation tensions may or may not be resolved. Chapters 4 and 5 demonstrated that though local governments remain legislatively confined in their capacity to allocate road space within their municipal boundaries, this set the stage for future conflicts, but did not determine how conflicts were resolved (spatial tension). Chapters 6, 7 and 8 revealed uptake of a demand stance in practice and organisational conventions has continued to evolve, yet remains contested and in flux (capacity tension). Chapters 7 and 8 revealed how strategic processes and decision-making frameworks frame and limit debate (liveability tension). Chapter 8 revealed how resolving competing local and metropolitan road space needs was shaped by specific disciplines in transport planning (network tension). As made clear throughout this thesis, though different individual chapters focused attention on one tension in particular, analysing road space allocation revealed that resolving one tension often unravelled another tension that required resolving.

With analysis of road space allocation now concluded, this chapter draws together the key findings from examining the urban studies literature (see Chapters 1 to 3), and empirical analysis of road space allocation (see Chapters 4 to 8). The chapter is divided into three parts. We begin by examining how findings accord, augment and diverge from urban studies. The discussion highlights a number of insights that enhance and contribute new knowledge to our understanding of how professional transport planning practice is constrained and constituted. Examining these insights is taken up in the second part of this chapter. The chapter concludes with this thesis' contribution to knowledge.

9.1 *Situating findings within the urban studies literature*

Finding 1: Politics and legislatively mandated responsibilities constrain and limit how practitioners view and allocate road space. This finding accords with more specific investigations of the determinant role that matters of governance and institutional structures have in urban planning (Curtis & Low, 2012; Flyvbjerg, 1998; March, 2007; Stone, 2008). The impact of politics on road space allocation should not come as a surprise. A wide body of evidence indicates all planning decisions are intrinsically political decisions (Flyvbjerg, 1998; Forester, 1989; Halligan, 1982; Klosterman, 1978; Sandercock, 1995). However, it is the way that governance intertwines with road space allocation that deserves continued critical analysis.

In this study, evidence drawn from policy analysis, interviews and participant observation show a legacy of state governments to give only partial support for road measures aimed directly at the car, and almost no political support for developing a policy package of push–pull measures (see Vuchic, 2000, chapter 6, for extended discussion). For example, in Chapters 5 and 8 analysis of the clearway controversy demonstrated how state government political objectives shape how road space allocation challenges are engaged. In Chapter 6, insufficient political support and a failure to define tram priority was found to alter the first Fairway programme's original design. Lack of political support for developing a policy package of push–pull measures was found to shape subsequent Fairway programmes. Findings from interviews reveal that most professionals perceive merit in applying *both* incentives and disincentives, but that existing state political priorities do not support a policy agenda based on integrating push–pull measures.

In his comparative study, Stone (2008) found that the strength of road-specific policy actor groups explained the lack of public transport priority strategies and projects in

Melbourne. In this thesis, several senior decision makers interviewed identified VicRoads as having a distinctive organisational culture. The culture was acknowledged to be in flux and transition, but its dominance substantiates Stone's (2008) conclusion that policy actor groups are potentially more important than institutional structures. Legislatively mandated road classifications examined in this study were found to delineate policy discussion boundaries of road space allocation. This in turn has helped state road authorities create a presence capable of weathering Victoria's volatile political landscape. This finding augments Stone's analysis. In particular, how new political skills were developed and honed during the 1950s and 1960s and how strong state road statutory authorities were been maintained during the 1980s government reforms (Stone, 2008, pp. 224-225).

Declared and undeclared road classifications continue to play an essential role in determining governing responsibilities. From the outset, state road authorities have been charged with declaring, and subsequently allocating space on declared roads, and local governments with managing and allocating non-declared road space. It was shown in Chapters 4 and 5 that since the 1920s, criteria applied in declaring a road have grown. Over time negotiations and legislative additions have resulted in a declared road network found today. This network includes roads with and without tramlines, setting the scene for future mobility conflicts. VicRoads has also remained a single-purpose authority since its creation in 1989. At a structural level, from divisions down to director titles, job duties and responsibilities, and from a strict senior decision-making standpoint, VicRoads has created a presence capable of weathering Victoria's volatile political landscape. This presence reflects aspects identified by Stone.

Finding 2: Normative decisions made by practitioners make small changes that impact how road space is perceived and allocated now and in the future. This finding substantiates evidence that urban planners play an important and active role in shaping how planning problems are resolved (Forester, 1989, 1999; Grant, 1994; Hoch, 1994; Lash, 1976). Analysing how constitutive elements intersect through engaging various road space allocation tensions has revealed how resolution to a particular problem emerges through the course of allocating road space. For example, examining on-street car parking controversies in Chapter 5 revealed that governance set the stage for future conflicts, but not for how conflicts are resolved. This finding accords with more detailed historical examinations of contested urban street life (Ehrenfeucht & Loukaitou-Sideris, 2007; Norton, 2008).

No one at the turn of the 20th century in Melbourne could have predicted the car's full impact to Melbourne's roads. Chapter 5 revealed how government, transport planners and the public learnt the pitfalls of on-street car parking together, in real time. This characterisation of transport planning was revealed in contemporary settings. In Chapter 6, alterations to Port Phillip council's organisational conventions opened up new opportunities for council to engage on-street parking problems through less traditional means. Yet, problems were not presented as self-evident, and solutions were not implemented immediately. Instead, organisational conventions resulted in professionals either ignoring or responding to publically identified car parking problems in protracted discussions. Thus, irrespective of the large compendium of professional knowledge and methods available to practitioners to resolve on-street car parking conflicts, resolution is not linear but slow and meandering; this reflects a recursive process of community consultation, policy development and community consultation. As such, resolution of different road space allocation tensions emerged from actions and decisions that occurred in real time, over the course of several months.

Finding 3: Increased privatisation significantly impacts a demand stance from becoming embedded in professional routines and organisational conventions. This finding substantiates the claim that privatisation has long-term implications which merit more critical attention, and which question the validity that increased privatisation results in improved planning outcomes (Alford & O'Flynn, 2012; Aulich & O'Flynn, 2007; Steele, 2009; Vigar, 2012). Findings from interviews recorded the cost of the outsourcing generated from continual restructuring. Many of those interviewed remarked on the significant changes they had witnessed over the past several decades concerning the way in which transport planning studies are conducted. Unlike a few decades ago studies conducted today are almost always conducted by external consultants. In turn, the public sector is adopting new skill sets such as contract management in order to participate in a more privatised form of urban and transport planning. This categorisation of professional transport planning provides further support for defining today's transport planning profession as a hybrid (Steele, 2009; Vigar, 2012). The hybridisation of transport planning was not explicitly examined in this thesis. Evidence from interviews does indicate that a shift from substantive planning matters to contract management has serious implications for what it means to be a professional transport planner. Both local and state transport planners interviewed regarded this new professional landscape released knowledgeable public servants

from their contracts. This resulted in shifting valuable competencies and expertise into the private sector and away from the public sector.

Finding 4: Engaging road space allocation tensions results in practitioners embodying knowledge and experience, making organisational conventions and professional relationships crucial to adopting a demand stance. This finding substantiates and provides new insight as to why actor groups are potentially more important than institutional structures (Curtis & Low, 2012; Flyvbjerg, 1998; Healey, 1997; Stone, 2008; Vigar, 2002). In this study, transport planners with multiple-authority experience were found to embody a unique communicative role. These professionals reflect important information conduits which helped a contact in one authority navigate complex bureaucratic arrangements to locate an appropriate contact in another authority. A more fleshed-out analysis regarding the numbers of such individuals, or the extent of their reach regarding policy, was outside the scope of this thesis.

In Chapter 6, interview participants who worked on Port Phillip Council's parking *Plan* were found to embody knowledge and experiences that remained with them long after leaving council. This finding substantiates the importance of more fine-grained analysis of practitioners working at the 'coalface' of planning (Forester, 1989, 1999; Hoch, 1994; Lash, 1976). In seeking to develop a nuanced picture of practice beyond an idealised form of rule-following, transport planners were found to reflect knowledgeable and capable actors engaging in complex problems. Embodied knowledge gained from prior experience was found to also assist practitioners in overcoming issues stemming from continuously changing state government mobility visions. This substantiates and enhances prior accounts regarding impacts from restructuring of state authorities in Melbourne (Curtis & Low, 2012; Dingle & Rasmussen, 1991; Stone, 2008). Restructuring of state planning authorities is often referred as facilitating a "managerial and financial revolution in the public sector" (Dingle & Rasmussen, 1991, p. 363). Yet, this "managerialist tenor" has been found to result in "political action" remaining focused on structural reform, not policy reform (Curtis & Low, 2012, p. 196), or provide a potential explanation for continued weakening of urban planning practice since the 1980s (Stone, 2008).

This study found that persistent restructuring—whether premised on improving government integration or the result of a change in state government—results in the incremental loss of organisational knowledge. This substantiates findings with regard to the negative implications and repercussions from organisational restructuring (Fisher

& White, 2000; Hooper, McDonald, & Mitchell, 1999; Sitlington & Marshall, 2011; Williams, 2004). For example, at the time that this research was undertaken, staff in VicRoads *Network Operating* division had recently reviewed the 1980 *Hierarchy of Roads* study (VicRoads, 2012a, p. 56). This occurred only after ideas were publically presented to a group of professionals. An audience member (later identified as a retired RoSTA employee) suggested merit in revisiting the earlier work. Consequently, local and state transport planners having multiple-authority experience, indicate informal stopgap measures to rectify lost knowledge from organisational restructuring, and continued outsourcing of staff and work to the private sector. This highlights how the trajectory of individual constitutive elements fluctuates with respect to intensity and duration. This point is expanded on in more detail in the second half of this chapter.

The organisation and management literature has long recognised the importance that accumulated knowledge (e.g. employee or organisational level) has in ensuring the vitality and competitive advantage of companies and organisations (Nonaka & Hirotaka, 1995; Orr, 1996; Tsoukas & Vladimirov, 2001). The urban studies literature has yet to draw more heavily on this body of work in the organisation and management literature. An exception comes from Novak and Hammer (2009), who presented findings from an employee survey undertaken by the Virginia Department of Transportation. Loss of knowledgeable employees due to retirement and attrition was found to result in “dissolution or weakening of networks through which tacit knowledge was shared” (Novak & Hammer, 2009, p. 17). Likewise, similar impacts were identified in this study from organisational restructuring.

Finding 5: Existing governance is insufficient to reconcile competing and conflicting local and metropolitan road space allocation needs. In Chapter 4, local governments were found to have remained legislatively confined in their role of road space allocation. This arrangement exists today, and in many ways, exacerbates already complex mobility challenges. Governance was found to set the stage for future conflicts, but not for how conflicts are resolved. Evidence from document analysis and interviews also substantiate that state road authorities have a more substantive role in engaging mobility challenges (Anderson, 1994; Curtis & Low, 2012; Stone, 2008). As the current state road authority, VicRoads dominance is supported by declared and undeclared road classifications. Additionally, unlike with land use and public transport state authorities, VicRoads has remained a single-purpose authority since its creation in 1989. Given today’s complex mobility challenges, findings drawn from this research substantiate the claim that traditional governance premised on local and state

delineations or transport modes, are inadequate and incongruous to resolve conflicting local and metropolitan mobility needs (Curtis & Low, 2012; Innes & Gruber, 2005; March, 2007; Mees, 1997; Stone, 2008; Stone & Mees, 2010).

In summary, Findings 1 through 5 show how constitutive elements intersect to determine and shape road space allocation in Melbourne. Evidence drawn from this research has also provided new insight which enhances and contributes new knowledge to our understanding of how professional transport planning is constituted and constrained. To elaborate on these insights, Table 9.1 examines the key findings in relation to objectives outlined in Chapter 1 and reintroduced below:

Objective 1: to identify and examine rules that govern and guide road space allocation

Objective 2: to explore professional norms and conventions that facilitate and constrain road space allocation.

Objective 3: to analyse how infrastructure influences road space allocation.

Objective 4: to analyse when, why and how a demand management stance has been applied in road space allocation.

The far left column in Table 9.1 places the four objectives in relation to the findings identified in the next column. The remaining three columns indicate literature that was previously examined in the first half of this chapter. In examining Table 9.1, it is useful to refer back to the discussion in Chapter 2 (specifically Table 2.4, page 39). This helps explain why headings in Table 9.1 reflect headings identified in Table 2.4. The mobilities paradigm (Urry, 2008) provides a worldview that accounts for *both* animate and inanimate elements. The different worldviews held within each urban study stream compared to that held by the mobilities paradigm explains why existing urban studies literature does not support all the findings outlined in Table 9.1. In examining Table 9.1, we can see for example that matters of governance are well documented across all three urban study streams. Conversely, only recent historical urban studies—which specifically draw from studies of technology and science—are found to incorporate materiality into analysis. We saw in Chapter 1 that examining how animate and inanimate elements intersect has been an overt ambition within the science and technology study literature (Biagioli, 1999; Hackett, et al., 2008; Jasanoff, et al., 1995). Findings listed in Table 9.1 therefore reflect the utility to examine the practice of transport planning as one of road space allocation.

Chapter 9 Advancing our understanding of road space allocation

Table 9.1: Key study findings in relation to literature and key thesis objectives

	Findings	Urban study stream		
		Practitioner	Institutional	Historical
Objective 1	Finding 1: Politics and legislatively mandated responsibilities constrain and limit how practitioners view and allocate road space.	Forester (1989, 1999) Hoch (1994) Grant (1994)	Curtis & Low (2012) Flyvbjerg (1998) March (2007) Stone (2008)	Sandercock (1975) Halligan (1982)
	Finding 5: Existing governance is insufficient to reconcile competing and conflicting local and metropolitan road space allocation needs.	Innes & Gruber (2005)	Curtis & Low (2012) March (2007) Mees (1997) Stone (2008) Stone & Mees (2010)	Halligan (1982) Davison & Yelland (2004)
Objective 2	Finding 2: Normative decisions made by practitioners make small changes that impact how road space is perceived and allocated now and in the future;	Forester (1989, 1999) Grant (1994) Hoch (1994) Lash (1976)	Fischler (1998, 2000b) Flyvbjerg (1998) Vigar (2002)	Clapton (2005) Ehrenfeucht & Loukaitou-Sideris (2007) McShane (1994) Norton (2008)
	Finding 2a: and thus highlight how the normative application of the hierarchy typology helps bring about closure to a number of road space allocation tensions	Jones (2014)	Brindle (1999) Goodwin (1995) Hess (2009)	Brown-May (1998) Hebbert (2005) Marshall (2005)
Objective 3	Finding 6: Resolving road space allocation tensions involve actors actively engaging, responding to and against inanimate elements such as technology and infrastructure.	Jones (2014)	Jones (2014)	Ehrenfeucht & Loukaitou-Sideris (2007) McShane (1994) Norton (2008)
Objective 4	Finding 3: Increased privatisation significantly impacts a demand stance from becoming embedded in professional routines and organisational conventions.	Steele (2009) Vigar (2012)	Alford & O'Flynn (2012) Buxton, Goodman and Budge (2005)	Aulich & O'Flynn (2007)
	Finding 4: Engaging road space allocation tensions results in practitioners embodying knowledge and experience, making organisational conventions and professional relationships crucial to adopting a demand stance;	Grant (1994) Healey (2009a) Hoch (1994) Innes & Gruber (2005) Lash (1976)	Flyvbjerg (1998) Healey (1997) Stone (2008) Vigar (2002)	Norton (2008) Clapton (2005) Ehrenfeucht & Loukaitou-Sideris (2007)
	Finding 4a: yet, such aspects remained constrained and constituted by discipline.	Jones (2014)	Curtis & Low (2012) Vigar (2002)	Bonham (2002) Brown (2006) Norton (2008) Hebbert (2005)
	Finding 7: As the hierarchy typology helps resolve multiple road space allocation tensions, adopting a commitment stance provides a mobility vision and rationale for adopting a demand management stance	Jones (2014)	Alexander (1966) Anderson (1978) Brindle (1997a) Goodwin (1995) Hess (2009) Mees (1997)	Hebbert (2005) Marshall (2005)

In addition to substantiating evidence documented in urban studies, examining how animate and inanimate elements intersect has provided new insight which further enhances the urban studies literature. We therefore turn our attention to examine how these findings contribute new knowledge to our understanding of how professional transport planning is constrained and constituted.

9.2 How intersecting elements resolve road space allocation tensions

Combining findings from Table 9.1 (i.e. Findings 2, 2a, 4 and 4a) with additional findings (i.e. Findings 6 and 7) show how intersecting elements resolve road space allocation tensions (Table 9.2). These subdivided and new findings reflect the strength in examining mobility as one of road space allocation. Understanding this point involves examining the findings in relation to each road space allocation tension as they relate to each of the three urban study streams (Table 9.2).

Table 9.2: Key study findings in relation to road space allocation tensions

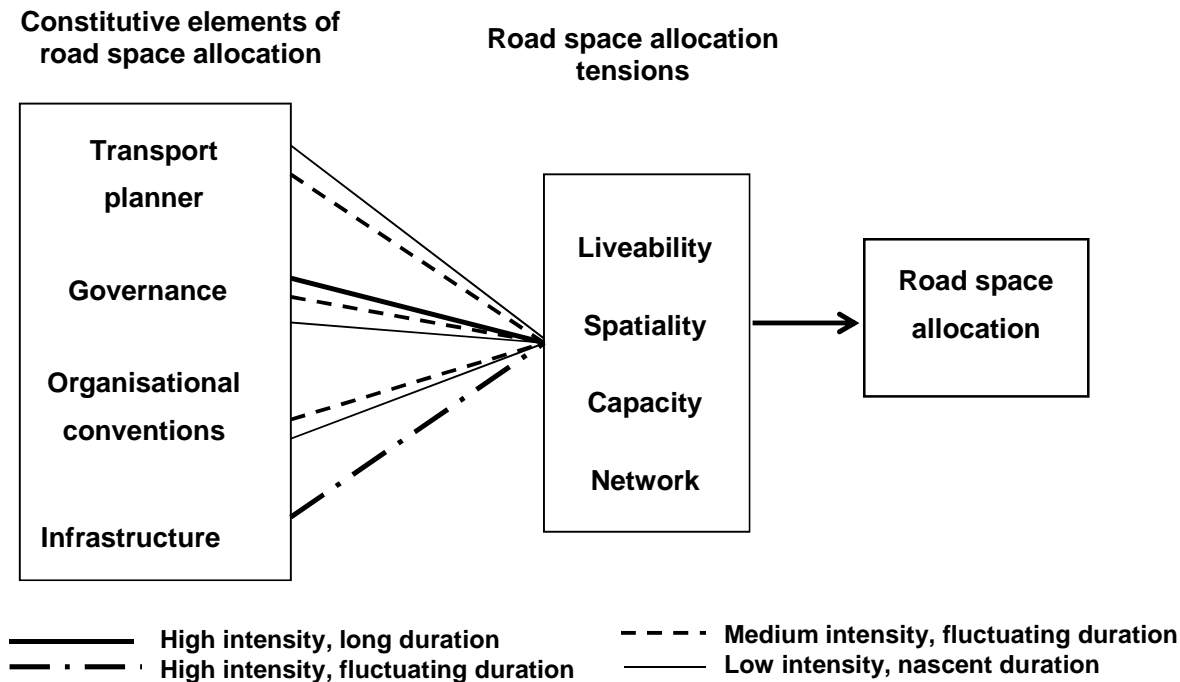
Findings	Urban study stream		
	Practitioner	Institutional	Historical
Liveability			
Finding 2a: Normative decisions made by practitioners make small changes that impact how road space is perceived and allocated now and in the future; and thus highlight how the normative application of the hierarchy typology helps bring about closure to a number of road space allocation tensions.	Jones (2014)	Brindle (1999) Goodwin (1995) Hess (2009)	Brown-May (1998) Hebbert (2005) Marshall (2005)
Capacity			
Finding 4a: Engaging road space allocation tensions results in practitioners embodying knowledge and experience, making organisational conventions and professional relationships crucial to adopting a demand stance; yet such aspects remained constrained and constituted by discipline.	Jones (2014)	Curtis & Low (2012) Vigar (2002)	Bonham (2002) Brown (2006) Norton (2008) Hebbert (2005)
Network			
Finding 7: As the hierarchy typology helps resolve multiple road space allocation tensions, adopting a commitment stance provides a mobility vision and rationale for adopting a demand management stance	Jones (2014)	Alexander (1966) Anderson (1978) Brindle (1997a) Goodwin (1995) Hess (2009) Mees (1997)	Hebbert (2005) Marshall (2005)
Spatial			
Finding 6: Resolving road space allocation tensions involve actors actively engaging, responding to and against inanimate elements such as technology and infrastructure.	Jones (2014)	Jones (2014)	Ehrenfeucht & Loukaitou-Sideris (2007) McShane (1994) Norton (2008)

In reviewing Table 9.2, we can see that analysing road space allocation as emerging from how various road space allocation tensions are resolved has revealed issues related to entrenchment of traffic engineering, particularly with respect to road classifications, decision-making frameworks and professionally. Additionally, continued use of the hierarchy typology in governance, policy and practice is further identified as central to resolving different tensions to varying degrees.

In an effort to improve our understanding of how transport planning is constrained and constituted, a conceptual framework was proposed in Chapter 2. Figure 2.3

conceptualised road space allocation as emerging from the intersection of transport planning, governance, organisational convention and infrastructure. Examining how the road space allocation tensions of liveability, spatiality, capacity and network came to be resolved, in turn shed light onto more specific areas within the practice of transport planning which provide affordance; irrespective of whether an element is animate or inanimate. The concept of affordance that guided analysis in this research outlined a heterogeneous perspective towards the relationship between animate and inanimate elements (Urry, 2008). Affordance (i.e. agency) explains and/or helps account for the intersection between the constitutive elements and tensions illustrated in Figure 2.3. This provided further support for adopting a commitment stance, based on the need to destabilise the dominant car paradigm (outlined in Chapter 1). This in turn has resulted locating Archer's (1982) 'degrees of freedom'. Degrees of freedom are crucial for helping knowledgeable practitioners locate more malleable aspects in professional practice that affords room for change. Given the findings of this thesis, an enhanced conceptual framework for understanding how transport planning is constrained and constituted is presented in Figure 9.1.

Figure 9.1: Enhanced conceptual framework to examine road space allocation



Lack of engagement with theories of materiality in transport planning studies result in narrow picture of how professionals act and make decisions (Vreugdenhil & Williams,

2013). Though inanimate objects don't have agency in the sense of human intentionality, accounting for materiality in this thesis has revealed how the contours of material agency emerge in daily work (Pickering, 1995). The terms intensity and duration reflect aspects of agency with respect to how the intersection of elements emerges through engagement and resolution of road space allocation tensions. Findings suggest three levels of intensity (high, medium, low) and three levels of duration (long, fluctuating, nascent). In particular, intensity and duration shape trajectory of influence (i.e. agency) for each of the four constitutive elements. Two brief examples drawn from the thesis are mentioned here to help ground the conceptual discussion concerning intensity and duration. The first example relates to governance and the second relates to infrastructure.

With regard to governance, state government political agendas have a determinate role in shaping longer-term mobility visions. The relationship between state government and state authorities results in cyclical and/or alternating mobility visions. For example, techniques and processes developed in the 1980s were dropped during the 1990s under a powerful mobility vision developed by the Kennett government, only to resurface during 2000. Mobility visions had a profound impact on shaping the everyday professional duties of professionals. Thus, the level of agency with respect to governance in this specific instance is highly intensive. This thesis has repeated the importance of accounting for the fine-grained detail of practice, particularly in relation to understanding how the intersection of constitutive elements is not known in advance, but emerges through the course of actively resolving one or more tensions. Yet, as identified in Chapters 5 and 8, residue created from resolving past road space allocation tensions impact the level of trust between state and local governments. As such, though the analytical gaze towards road space allocation has been directed to the fine-grained aspects of practice, such residue clearly indicates a level of influence that extends far beyond that of one particular instance of road space allocation. Thus, the level of agency held by alternating mobility visions as dictated by state government agendas is also long in duration.

With regard to infrastructure, the design objectives for tram super stops examined in Chapter 6 were found to reflect a mix of competing interests and aims. In the case of the super stop, objectives were based on designing a stop to meet passenger needs. Thus, amenities included larger shelters and electronic displays. In the case of the easy stop, state officials tested the design at a local airport to ensure that large vehicles could travel at 30 km/hr over the stop, yet still meet passenger requirements.

Thus, the design was based on integrating pedestrian and vehicle needs. Nothing in the easy stop design prevents larger shelters or electronic displays. Thus, key differences in design remain with objectives. Yet, in both cases, tracing the contour of materiality reveals that it was application of such objectives, resulted in actors manipulating inanimate material to successfully achieve such objectives. Thus, the level of material agency in this case is highly intensive. Yet, once constructed, the tram platform stops simply became part of Melbourne's wider road network. As such, though the contours of materiality have high intensity, such intensity has fluctuating duration given its affordance to the specific situation. This aspect of high intensity and fluctuating duration is further underscored with the contested nature of the tram stop constructed on Bridge Road (Chapter 6). Though professional knowledge and organisational conventions facilitated a demand management stance to resolve the hospital site, the contours of materiality resulted in a non-DDA compliant tram stop. Again, this reflects high intensity, yet fluctuating duration.

In summary, the enhance framework underscores that not only is it important to account for how the intersection of elements emerges through the course of professionals conducting their professional duties, but that such elements have differing trajectories of intensity and duration when intersecting. Examining these insights further in relation to road space allocation tension further underscores this point, and helps to further reveal new knowledge that enhances and contributes to our understanding of how professional transport planning is constrained and constituted.

9.2.1 How the liveability tension is resolved

Resolution of the liveability tension occurs through use of road classifications and operationalization of such classifications through decision-making frameworks and strategic processes based on the hierarchy typology. Examining the open-ended conceptualisation of scientific knowledge provides insight to understand exactly how the typology helps to resolve the liveability tension.

An open-ended account of scientific knowledge highlights how new knowledge is relatively similar to established knowledge (Pickering, 1992a). This conceptualisation rests on the philosophical dilemma of closure (Barnes, et al., 1996; Pickering, 1992a). Closure is understood here as achieving consensus around a transition in or extension of science. Stated another way, if one day scientists believed the world to be flat, and the next day it was demonstrated that the world was round, what would happen? How

did the scientific community adopt new scientific knowledge of the round earth, when the previous day it adhered to a set of conventions and ideas of a flat world?

This question can be altered to suit the topic of road space allocation and the liveability tension. Thus, if one day transport planners believed road space was best used for both communication and transaction purposes, and the next day, arrival of technology such as the bicycle and tram suggested one purpose should take priority over the other, what would happen? How did transport planners adopt new knowledge to facilitate road space being primarily used for travel (communication)? As we have seen, this question can be refined to highlight road space allocation in Melbourne. Thus, how have transport planners continued to find closure around resolution of the liveability tension, based on new mobility visions developed from change of government?

Former Chief Research Scientist at the Australian Road Research Board, Ray Brindle, has noted very clearly his reservations regarding classifying roads by functional road hierarchies. In a university oriented textbook *Traffic engineering and management*, Brindle's (1999, p. 56) chapter opens with the following statement:

Road classification' is a means to an end, not an end in itself. Successfully allocating agreed labels to each element in the road system involves so much effort and controversy that it is pointless and best avoided unless the labels are going to have some application.

Brindle (1999, p. 57) goes on to state that the “essential thing to remember is that roads are not modes – they are a type of infrastructure which may be used, to varying degrees, by a wide variety of users and modes.” The caution reflects several decades of research (Brindle, 1997b, 1997c, 1997e, 1999). And yet, in Chapter 7, a trend—it was suggested a persistent and deeply-rooted pattern—was identified between application of road classifications based on the hierarchy typology, played a central role to resolving the liveability tension. Lay (2003) has previously noted that MTPC's 1929 *Plan for General Development* provided one of the earliest examples of a road hierarchy being applied to plan road space. When taken from a longer historical view, MTPC's *Plan*, MTC's 1969 *Transportation Plan*, the *Hierarchy of Roads* study and *SmartRoads*, reflect a deep attachment to the hierarchy typology.

In transport planning, the hierarchy typology is not discussed. It is more commonly understood under the term 'conventional road classification hierarchy' (Goodwin, 1995;

Hass-Klau, 1990; Marshall, 2005; Plowden, 1972). It was noted in Chapter 2 that though cumbersome, the term hierarchy typology reflected a schema transport planners employed to bring closure and reconcile the spatial tension, and in so doing help resolve the network tension. Specifically, hierarchy, defined as an arrangement or classification of things according to relative importance or inclusiveness (Oxford Dictionary, 1993a), and typology, defined as a classification according to general type (Oxford Dictionary, 1993b), together provide a blueprint to merge road classifications (i.e. typology) into the conventional road classification hierarchy (i.e. hierarchy).

The development of the hierarchy typology did not stem from a single point of origin, but emerged with the transformation of road space from social places to social spaces (Gieryn, 2000 for distinction). It has remained instrumental in addressing the liveability tension. Chapter 3 showed how the hierarchy typology grew from consensus within different planning disciplines. The typology embodied in “visible and tangible ways the cultural meanings variously ascribed to them” (Gieryn, 2000, p. 474). This simultaneously created knowledge and conventions that reaffirmed its usefulness. It successfully merged notions that roads were private space (facilitated by the “auto”-mobile) with the circulation metaphor (Thrift, 1996). This provided an emergent planning profession with a blueprint to translate “scientific” knowledge onto road space. In turn, road space (form) became informed (structured) by the conventional road hierarchy classification (function). The hierarchy typology provided an emerging traffic engineering profession with a blueprint to curtail the “promiscuous mixing of local and through traffic on the same streets” (Brown, et al., 2009, p. 163). This resulted in viewing road space as dichotomous rooms and corridors. Chapters 4 and 5 traced the implications of operationalising the hierarchy typology in historical settings, and Chapters 7 and 8 provided analysis of more contemporary settings. The hierarchy typology therefore can be viewed as helping to formalise a language that multiple disciplines could understand.

Traffic engineering literature continues to advocate road classification hierarchies as a framework to improve traffic flow and minimise travel-related costs (Elshafei, 2006; Gonzales, 2011). Critical analysis of road classifications or the conventional road classification hierarchy has been limited to examining issues of governance (Brindle, 1999; Goodwin, 1995; Hess, 2009), and urban design (Hebbert, 2005; Marshall, 2005). Findings drawn from this thesis are therefore situated to provide new knowledge and insight into how the hierarchy typology influences transport planning practice.

There is a growing body of evidence which is highly critical of urban and transport planning frameworks and standards (Fischler, 1998; Huxley, 1994; Southworth & Ben-Joseph, 1997). Brown-May (1998) has previously alluded to the powerful role that the street grid had in arranging Melbourne's daily street life. Professional practice and knowledge intersected with the street grid. This resulted in physically demarcating different classes of streets and cementing a specific socio-economic status to each street (Brown-May, 1998, pp. 23-24). Customs identified by Brown-May established the groundwork for later engagement of procedures and processes incorporating the hierarchy typology. Similarly, attempts to categorise how urban society engages with its human landscape, such as Mumford's (1963) "city as theatre", Jacob's (1961) "street ballet", and Whyte's (1988) "stage", collectively highlight a belief that space between buildings is as important, or more important than that of the buildings themselves. Findings drawn from this thesis strongly suggests several substantive issues with regard to how the hierarchy typology is operationalised to allocate Melbourne's road space.

As currently configured, *SmartRoads* prioritises liveability for residential roads over that of heavily trafficked roads. As currently operationalised, the hierarchy typology informs transport planning knowledge (i.e. defines road space through road classifications); informs organisational conventions and governance (i.e. declared and non-declared road space defines parameters and responsibilities); and defines both the process and potential outcomes (i.e. decision-making frameworks provide rules for how and what road space is allocated and why). Yet, understanding how this in turn helps bring about closure and therefore resolve the liveability tension, involves understanding how the hierarchy typology is applied in daily professional practice. Again, this underscores the need to take account of the doing, or the allocating of road space.

The hierarchy typology helps to bring closure around the liveability tension by providing transport planners with a closed feedback loop in which to understand, discuss and make determinations regarding how to reconcile communication and transaction. This finding augments explanations of transport planning premised on concepts such as discursive storylines (Curtis & Low, 2012; Vigar, 2002) or frames (Tennøy, 2010). For example, Curtis and Low (2012, p. 197) found that when planning's long-held belief of protecting amenity, came up against the need for new infrastructure, storylines held by planners and traffic engineers merged around the notion of balancing values of mobility and amenity. A question remains: how did the divergent storylines merge or find closure? Similarly, Tennøy's (2010) study of transport planning in Norway found

frames not only predetermined what actors perceived as a primary objective and problem, but what methods and solutions were considered valid and appropriate to evaluate and solve the problem. Different frames were found to align with land use or transport planning knowledge. Though acknowledging that one body of knowledge might have greater impact on transport planning more than others, questions still remain regarding how the dominate body of knowledge brought closure.

In Chapter 2, Archer's (1982, p. 461) discussion of degrees of freedom highlighted the need to examine when agency held by knowledgeable actors affords for transformative outcomes, or when structure remains more stringent and constraining. We saw in Archer (1982) argued conflating agency and structure fail to provide analytical avenues to identify malleability in structural elements. This in turn failed to identify 'degrees of freedom', or explain the conditions for when change occurs. Concepts such as a frame or storyline provide powerful explanatory accounts to understand the types of conditions identified by Archer. Examining how transport planners operationalise the hierarchy typology is found to provide further insight from which to understand Archer's concerns. This builds on and enhances how professional transport planning practice is currently conceptualised and analysed in the urban studies literature.

Professionals often go into meetings with a specific task or order, often predetermined by position description and/or set by senior management and state cabinet levels. It is reasonable to assume that such orders are produced and maintained through storylines and interpreted by competing frames. Although these concepts provide insight for how practitioners arrived at a problem, they remain limited in explaining how resolution comes about. Transport planners interviewed in this research were often found to be critical of existing policy narratives. Although professionals did not articulate such narratives as a storyline or frame, they demonstrated an awareness that existing policy narratives were either problematic and/or limited their ability to reduce car-specific infrastructure. Therefore, professionals often sought more malleable processes to resolve road space allocation tensions like liveability. This in turn required a mechanism to translate divergent policy narratives and competing organisational objectives. Operationalisation of the hierarchy typology in strategic processes and decision-making frameworks provides transport planners with a mechanism to translate conflicting views of road space. This in turn helps bring about closure. Translation helps to develop consensus, even when not addressing an actor's specific needs and therefore, helps to get road space allocation done.

9.2.2 How the capacity tension is resolved

Resolution of the capacity tension occurs through engaging other road space allocation tensions. Such engagement in turn results in practitioners embodying knowledge and experience; yet such aspects remained constrained and constituted by discipline.

Making the normative determination to meet existing and future mobility pressures, or deciding to suppress and modify mobility systems and networks towards a different future, is a choice that every urban city must find and take their own position on (Brindle, 2001). However, uptake of a demand stance, though acknowledged in policy, was shown in this research to be only partially institutionalised into practice, organisational conventions and governance. Though this finding substantiates Evans, Guy and Marvin's (1999) conclusion that a demand management stance has yet to reach the status of a black-box category in transport planning, evidence as to whether a shift has even occurred is conflicting.

In examining institutional barriers to active transport (ie: walking and cycling) in a small region outside of Brisbane, Queensland, Australia, Cole et al (2010, p. 502) noted that as a new area in transport planning, successful engagement of active transport requires "a different skill set and expertise beyond traditional road programmes that include community engagement, collaboration with non-traditional transport sector partners, and technical skills for planning and design of public transport, and walking and cycling networks". Similarly, though many interviewees perceived traffic engineering as a degree in problem solving, questions remain as to how comfortable traffic engineers are in the emerging field of demand management. We have seen that engaging complex mobility challenges results in practitioners embodying crucial knowledge and experience, making organisational conventions and professional relationships crucial to adopting a demand management stance. This knowledge and experience is constrained and constituted by specific disciplines.

The entrenched nature of economics (Curtis & Low, 2012; Mees, 2000) and traffic engineering (Curtis & Low, 2012; Hebbert, 2005; Vigar, 2002) in transport planning is well documented. Vigar (2002, p. 204) found that the bulk of the UK's civil service involved in transport planning comprised largely of economic and traffic engineering disciplines. The discipline's entrenchment therefore represented both "part of the problem and the solution" to complex urban infrastructure challenges (Vigar, 2002, p. 205). Findings drawn from this research make more explicit, the impact that traffic engineering has in transport planning.

We saw in Chapter 5 that changes in the profession of transport planning occurred alongside the rise of the car. Of the different disciplines that became professionalised, traffic engineering rose to dominant transport planning. The issue of traffic engineering in transport planning is therefore not specific to traffic engineering per se, but to its evolution as a profession alongside the car (Hebbert, 2005). This distinction provides a critical lens to understand the linear narrative of transport planning (see Chapter 2).

In this research, transport planners interviewed were found willing, and in many cases, actively engaging complex mobility challenges. Similar to successfully engaging 'active transport' (Cole, et al., 2010), adopting a demand stance involves new professional knowledge, skill sets and working practices. Thus, questions remain as to what extent traffic engineers at the coalface of transport planning are in fact, even creating a new engineering manual as identified by many interview participants. Specifically, questions remain as to what extent a new traffic engineering manual can and will incorporate non-traffic engineering knowledge, skills, methods and theories. Today's complex mobility challenges require incorporating knowledge from multiple disciplines, including traffic engineering. However, business funding mechanisms, organisational, project and process performance criteria, and wider policy language, collectively reflect a very deep institutionalisation of traffic engineering. Consequently, traffic engineering helps constitute and constrain transport planning.

In examining professional urban planners in Melbourne, March (2007, p. 374) found planners adhered to "regularised procedural roles in the institutional 'spaces' created by the regulatory framework." These institutionalised spaces created a circular paradoxical situation: planners who successfully used the planning system to achieve goals on a case-specific basis unintentionally discouraged the creation of a new knowledge (March, 2007, p. 385). Instead of a profession acting as a repository of substantive planning knowledge based on ethics, theory, and beliefs, the circular paradox situation tied planners to specific roles (March, 2007, p. 384). The paradox identified by March results in successful use of planning processes discouraging the creation of new knowledge. This suggests that the same occurs in transport planning.

Issues related to traffic engineering are cumulative, which in turn shed light into disproportionate distribution of agency in road space allocation. In examining *SmartRoads*, we can see the process legitimises transport planning knowledge, which historically has been premised on traffic engineering knowledge (i.e. agency). This gives unequal weight to traffic engineering (i.e. structure). Further, more than half of the

interview participants were found to hold either or both a civil or traffic engineering degree, giving unequal weight to traffic engineering (i.e. agency). Agency is held within the institutionalisation of traffic engineering criteria currently applied in *SmartRoads*, as well as remaining the dominant educational background. Further, policy levers, funding mechanisms, and organisational and project performance criteria collectively reflect a very deep institutionalisation of traffic engineering. *SmartRoads* currently shifts mobility from non-declared roads to declared roads. As we have seen, this in turn brings issues related to the liveability tension to the fore. This further underscores how resolving one tension often unravels another tension that requires attention. Consequently, entrenchment of traffic engineering in transport planning is cumulative. The entrenchment requires altering March's paradox to fit transport planning. Thus, successful use of strategic processes, even by non-traffic engineering professionals, and without altering traffic engineering criteria, discourages creation of new knowledge.

In altering the paradox forwarded by March, findings for this thesis are found to both support and diverge from March's findings. On the one hand, re-allocation of road space has occurred; albeit, geographically demarcated. This finding supports that professionals remain tied to institutional procedural roles created by regulatory frameworks. The conflicting ways that congestion was defined and understood further supports a gap in a unified and robust repository of knowledge. On the other hand, instances of re-allocation of road space demonstrate adoption of a demand stance. Although adoption remained constrained by governance and organisational conventions, analysis highlights varying aspects of agency, held by transport planners and by infrastructure. In Chapter, examining the *Acland Street* project revealed practitioners did direct research to gain new knowledge on the value of car parking for retailers vs. retailers' perceptions. Survey results nurtured support within both council and business circles to re-allocate the Acland Street tram shopping corridor with the specific aim of affording trams the greatest priority. This underscores successful transport planning does occur and when it does, it is often through creation of new knowledge; specifically non-traffic engineering knowledge.

9.2.3 How the network tension is resolved

In discussing how the liveability tension is resolved, it is clear that application of the hierarchy typology in *SmartRoads* is also critical to obtaining closure around how to resolve the network tension. *SmartRoads* has the potential to provide transport planning viable methods and techniques to help resolve the wicked problem of mobility.

Wicked problems by definition cannot be solved in the sense that there is one answer, but instead are reproblematised and resolved over and over again (Head, 2008). Specifically, its two key strengths are flexibility and transparency. It can be applied to any road network and provides transparent principles that help translate conflicting ideas to reach consensus. These two strengths help *SmartRoads* translate tacit knowledge held by transport planners.

Polanyi's (1989) bicycle analogy perfectly illustrates tacit knowledge and the utility of *SmartRoads*. The analogy underscores the limitations of providing someone with step-by-step procedures for riding a bicycle. Thus, adjusting one's balance based on the curvature of the bike's path in proportion to a ratio of balance and speed would likely result in the cyclist falling. Alone, such technical rules are useful only if they serve to guide and "only if they can be integrated into the practical knowledge of the art" (Polanyi, 1989, p. 50). Similarly, technical rules for road space allocation, alone, are inadequate. *SmartRoads* was identified as providing three important goals: 1. communicative-oriented-like processes capable of sufficiently catering for multiple perspectives, 2. transparent evaluation process to draw out contentious points in order to make a decision based on consensus, and 3. accounted for issues with re-allocating road space at the local or corridor level against metropolitan needs based on optimising the overall road network. All three points are normative in nature.

Yet, as currently configured, *SmartRoads* resolves the liveability and network tensions by prioritising some roads as more important than other roads. This approach was identified above as reflecting the dominance of traffic engineering, road classifications and road hierarchy. As such, the efficacy of transport planning to guide Victoria's urban mobility system towards a different future has yet to create a mobility vision that accounts for all types of road space. Until such time, it appears that for now, engaging complex road space allocation tensions involve some roads always being classified as less important. However, it is suggested here that adopting a commitment stance can help provide for a mobility vision and rationale for adopting a demand management stance in which not only helps reconcile the network tension, but provides a potential avenue where all roads can be classified as equal.

Evans, Guy and Marvin (1999) were identified in Chapter 2 as suggesting that scholars investigating complex urban infrastructure issues adopt a commitment stance. Whereas a neutral stance examines the content of knowledge claims, a commitment stance shifts analysis to investigate the "process through which knowledge claims are

elicited and evaluated" (Evans, et al., 1999, p. 109). It has been made clear that this thesis adopts a commitment stance.

Understanding how adopting a commitment stance can help resolve the network tension can be illustrated by further expanding on the above discussion concerning resolution of the liveability tension in relation to the hierarchy typology. Scholars continue to re-visit the hierarchy typology. For example, Schumacher's (1978) discussion of link and place, strongly reflects, in objective and title, Jones, Boujenko and Marshall's (2007) *Link & Place*. Yet, for the same reasons that different urban study streams identified in Chapter 2 theorise and account for agency differently, also provide insight for why different streams fail to build on prior conceptualisations of the hierarchy typology. Specifically, different accounts of the hierarchy typology remain confined to specific disciplinary bodies of scholarly knowledge. This highlights two important points with regard to resolution of the network tension. First, application of the hierarchy typology to allocate road space is normative. Second, in building on this first point, adopting a commitment stance in turn shifts attention to incorporating hierarchy typologies with the specific aim of destabilising the dominant car paradigm. To understand these two points further, we briefly unpack different examples of how the hierarchy typology has been conceptualised. This more theoretical discussion is then grounded by a brief account of implications from adopting a commitment stance might have with regard to how road space is currently allocated in Melbourne.

The dominant car paradigm is guided by a Euclidian worldview that perceives roads as space containers temporally independent of abutting land use space containers (Graham & Healey, 1999). Friedmann (1993, p. 482) has previously signalled the need to construct a non-Euclidian world of "many space-time geographies." This accords with an array of non-linear theories of time, space and place found in the urban studies literature (Graham & Healey, 1999; Lefebvre, 2010; Thrift, 1996; Urry, 2008). Ellis's (1978) analogy of 'felt volume' and Alexander's (1966) 'semi-lattice axiom' represent two examples of organic theories of road space that address many of Friedmann's concerns. We briefly examine each theory in turn.

Schumacher (1978, p. 145) provides useful definitions to understand Ellis's analogy of felt volume. Schumacker argued a road's configuration and relation to adjacent land uses (i.e. communication) must be weighed against its local context (i.e. transaction). Schumacker (1978, p. 149, notes 14, 15) defined link and place as:

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A road space's place qualities relate to its ability to be understood and used as a setting for activity. When road space affords an actor personalisation of space similar to that of their dwelling, place is seen as optimised.

A road space's link qualities relate to its ability to be understood as a preferred way of getting to a particular goal(s). When road space affords an actor equal access to buildings, adjacent space and other streets, link is seen as optimised.

Based on these two definitions, Ellis's "felt volume" describes the "literal and metaphorical" transformation of road space into exterior city rooms. Ellis argued that road space had two primary constitutive properties - space (e.g. space or void often as they relate to links for movement) and place (e.g. place or built characteristics often as they relate to quality of place). Successfully blending these two properties resulted in human perception finding it difficult to perceive voids created from solids. Thus, *integrating a road's social and operational functional activities* allowed for human perception to feel the volume of urban space (Ellis, 1978, p. 117, emphasis on italics). Though discussing space and place as binaries is limiting, the analogy's essence accords with contemporary social and urban theories (Graham & Marvin, 2002). Yet, like much of Anderson's (1978) *on Streets*, Ellis' work has yet to receive substantive engagement by transport planners.

Urban designer/architect Alexander (1966) worked with similar theoretical notions of road space to that of Ellis. Alexander posited cities naturally organised into complex structures that reflect a semi-lattice and not tree. Alexander defined a semi-lattice as when: "two overlapping sets belong to the collection, then the set of elements common to both also belongs to the collection" (Alexander, 1966, p. 4). In contrast, a tree is defined when: "for any two sets that belong to the collection, either one is wholly contained in the other, or else they are wholly disjoint" (Alexander, 1966, p. 4). A tree represented the simplest mental analogy humans employ to engage complexity (Alexander, 1966, p. 17). In contrast, a semi-lattice represented normatively defined sets, made up of a collection of elements that belonged together. Elements that co-operated and worked together formed a set of a larger interconnected system, which was best represented as a semi-lattice, not a tree. For example, physical elements might include a bike lane or café; institutional elements might include council boundaries; and planning elements might include building height and zoning. From the perspective of a tree, elements such as bike lane or café create an urban system that reflects a simplified semi-lattice. This is because the collection of sets constituting a tree *remain disconnected from other collections except when perceived as an entire*

system (Alexander, 1966, p. 9, emphasis added). The less dynamic a system's coherence, the more likely the system reflects a tree. Although well cited, Alexander's ideas followed a similar trajectory to that of Ellis, remaining either neglected or contained to urban design and architecture disciplines.

In briefly unpacking organic theories of the hierarchy typology, adopting a commitment stance requires such conceptual ideas be grounded in reality. Thus, we now turn to examining the potential implications that adopting a commitment stance might have with regard to how road space is currently allocated in Melbourne; in particular how road space is allocated under *SmartRoads*.

As currently operationalised, *SmartRoads* seeks to reduce congestion and maximise peak hour travel. This goal provides a narrow view of mobility, and does almost nothing in the way of reducing car travel. In adopting a commitment stance, we turn to the public transport network literature for guidance (Dodson, Mees, Stone, & Burke, 2011; Nielson, 2005a, 2005b). The network perspectives advanced in *SmartRoads* and the public transport network literature is found to provide several overlapping considerations that augment and strengthen each perspective. Importantly, drawing insight from the above discussion of organic theories of hierarchical typologies provides for a critical lens to examine whether *SmartRoads* or the public transport network literature forward hierarchical typologies that reflect a tree or semi-lattice, or to what extent they successfully merge the road properties of communication and transaction.

Alexander's (1966) main objective was to ensure that both social and infrastructural elements were joined. The main objective of VicRoads' (2012a) Road Use Hierarchy is to manage Melbourne's road network based on route, place and time. The public transport network literature does not mention Alexander's lattice axiom (Dodson, et al., 2011; Nielson, 2005a, 2005b). Yet, a pre-requisite of the network approach is to hierarchically arrange public transport modes, based on ensuring seamless, interconnected transfer points. The objective is to create a flexible mobility experience comparable to that provided by the car (Mees, 1997). Requiring transfer points, though hierarchically arranged, provides for an interconnected public transport system; a key criteria of the lattice axiom. Both typologies focus specifically on mobility and travel priority. However, whereas travel priority in *SmartRoads* is premised on a tree, travel priority under the public transport network literature is found to be premised on a lattice.

The public transport network literature outlines a significantly different normative decision-making structure compared to that found in *SmartRoads*. Replacing the Road

Use Hierarchy with a public transport network hierarchy alters the primary objective of *SmartRoads*: from efficient and fast mobility, to creating a holistic multi-modal transport system. Instead of advocating that trams have priority, decisions are based on how priority improves synchronisation of train, tram and bus routes. Given that the multi-modal public transport system in Melbourne primarily operates on the same contested road space as motorised and non-motorised vehicles, *SmartRoads* has a real opportunity to develop a more fully integrated mobility system. Further, *SmartRoads* also accounts for non-mobility needs, a crucial consideration highlighted throughout this thesis. Thus, road space allocation is determined not only by the normative criteria of synchronising public transport modes, but also by preserving the non-mobility characteristics and attributes of road space.

SmartRoads develops a base case for how a road network currently operates, and then provides a transparent process to alter network operations. This in turn can help make professional tacit knowledge more explicit and more explicit the normative aspects of road space allocation. Similar to evidence of lost organisational knowledge (Section 9.1), the importance of tacit and explicit knowledge has been found to be critical in professional work (Cook & Brown, 1999). Yet, integrating the network principles and *SmartRoads* based on the key objective of reducing car travel and improving public transport synchronisation, would require a multitude of changes with different time frames.

A discussion of some of these changes highlights how each is also impacted by the conceptual elements examined in this research. For example, transferring between train, bus and tram routes is a cornerstone of the network literature. Norms and competencies held by Melburnians would need to change and be expanded (social/cultural element, potentially long timeline). Setting up a public transport system based on network principles requires altering existing routes. The current private/public partnership arrangements would need to be examined, as many bus routes would require alteration (governance and organisational elements, short-medium timeline). Improving synchronisation and transferring between modes would require re-allocation of road space, changing traffic signal operation and upgrading existing underground detection technologies to improve public transport priority, and significant retrofitting of existing train, bus and tram stops to ensure easy transferring (infrastructure element, short-medium timeline). The changes listed here would require creating a mobility vision. Developing and implementing this vision would require significant change to funding and various governance aspects capable of withstanding

Victoria's volatile political landscape (governance elements, medium and long timeline). Finally, integrating *SmartRoads* objectives and public transport network principles would require new professional knowledge, skill sets and working practices (transport planning and organisational convention elements, short-medium timeline).

We have seen that consensus around how to allocate Melbourne's road space, based on what criteria and to achieve what goals is contested in policy and practice. Adopting a commitment stance to integrate principles advanced in both *SmartRoads* and the public transport network literature can provide a more robust approach to engage complex mobility challenges; particularly car-related ones. Though the changes listed above are not comprehensive, successful implementation would still be determined and shaped by how animate and inanimate elements intersect.

In summary, scholars continue to re-visit the hierarchy typology. Yet, different accounts of the hierarchy typology remained confined to specific disciplinary bodies of scholarly knowledge. Thus, traffic engineers can learn much from Ellis' (1978) "felt volume" concept and urban designers can learn much from the public transport network literature (Dodson, et al., 2011; Nielson, et al., 2005).

9.2.4 How the spatial tension is resolved

Resolving the spatial tension occurs through how knowledgeable transport planners actively engage with, react to and/or against, a specific portion of road space in question being allocated. Resolution often occurs through actors actively using technology to help overcome the spatial tension. Consequently, the contours of material agency have been revealed through examining how actors manipulate, use and react to and against, a multitude of inanimate materials such as technology, artefacts and road space. Lack of engaging theories of materiality represents a significant lacuna in the urban studies. Thus, accounting for materiality in this research has provided new insight and knowledge to understand how transport planning is constrained and constituted.

One of the most common themes identified by scholars as to why implementing policy remains difficult is power. Power, however defined, originates and flows through a variety of sources, most notably political and business interests. Scholars have documented a long history of transport planners succumbing to politically palatable strategies and capitulating to people's desires (Flyvbjerg, 1998; Forester, 1989; Klosterman, 1978; Sandercock, 1995). For example, transport planners in Victoria

continue to pursue completion of freeway plans originally outlined in the Melbourne Metropolitan Board of Works' 1954 *Melbourne Metropolitan Planning Scheme* and the Metropolitan Transportation Committee's 1969 *The Transportation Plan* (Davison, 2000; Davison & Yelland, 2004; Mees, 2000; Stone, 2008). Yet, a substantial international body of evidence indicates that determining to build or not build a freeway is deeply intertwined with politics and business interests (MacKenzie, 1985; Mohl, 2004; Plowden, 1972; Rundell, 1985; Sandercock, 1975). Consequently, focusing analytical attention to such concerns dismisses analysing how infrastructure more generally, shapes the daily activities and actions of transport planners.

Vreugdenhil and Williams (2013) more recently documented the implementation and removal of white bicycle lanes in the local council of Launceston, Tasmania. Central to the removal of these bicycle lanes was a series of public debates over the white lines. The benign white lines "had the capacity to challenge and destabilise the obduracy of the existing transport regime" (Vreugdenhil & Williams, 2013, p. 290). Over the past several decades, social conventions had built up around how cars and bicyclists interact on narrowly confined road space. In turn, the white lines transformed, materially speaking, into an affront that ignored such conventions. The public regarded the white lines created a more dangerous situation between bicyclists and cars. Likewise, in this study the yellow Fairway lines were found to have left an indelible mark in road space allocation.

In Chapter 6, analysis of the Fairway programme and subsequent tram priority trials found the yellow Fairway lines transitioned into an artefact of importance. Heated consultation over clearways further galvanised mistrust between local and state transport planning authorities. The clearway controversy was found to be translated through the yellow lines, which made harnessing consensus around un-related tram priority projects more challenging. Examining the *Nicholson Street Route 96 Full Tram Priority Trial* also revealed how road space, tram routes, passengers and trams, underground detection devices and car traffic, intersected to shape the testing of 'tram priority'. The trial provides a clear illustration of how problems arise when transport planners work with materials, which are resolved by actively engaging with those materials (Pickering, 1995).

In Chapter 8, infrastructure treatments and road measures applied to Swanston Street were found to provide a critical pivot point in how transport planners viewed the limitations and applicability of such measures for other road corridors within Melbourne.

This finding supports understanding why mobility controversies are derived from a complex intersection between technology and society (Evans, et al., 1999). Whereas a clearway can be quickly implemented and unimplemented, the obdurate nature of treatments that have continued to be applied to Swanston Street provide valuable reminders of the years of debate, discussion and planning that feed such alterations. Such material changes almost ensure a complete destabilisation of the street's primary function of mobility. As Melbourne's core tram corridor, both mobile and non-mobile activities and needs will be forced to synchronise and blend into one another if tram operations are to remain unaffected.

Though governance and organisational conventions were found to shape the decisions of knowledgeable actors, decisions were also found to be shaped by how actors interpreted Melbourne's built fabric. In the case of the yellow Fairway lines, the lines materially solidified past debates and controversies into a kind of residue which informed how future tram priority trials would be conducted. In the case of Swanston Street, the street's transformation acted as a material reminder of the time and manpower involved in re-allocating road space. Thus, what might be perceived as benign yellow tramlines or unique characteristics of Swanston Street, are in fact better understood as material reminders of what past local and state transport planners defined as appropriate use and allocation of road space.

In developing new competencies and skills to resolve the capacity tension and transition towards a demand management stance, we have seen that applying such skills will result in unexpected outcomes. It is evident that however road space allocation tensions are engaged, the actions and decisions of transport planners are shaped by materiality. In the case of the Bridge Road site, bringing materiality to the fore highlighted how multiple road space allocation tensions intersect. For example, both parties generally agreed with applying a demand management stance to resolve the hospital site (capacity tension). VicRoads and DOT transport planners were happy to pursue a DDA compliant tram stop at the Bridge Road site (liveability tension). But, the narrowness of Bridge Road prevented a new tram stop from being DDA compliant (spatial tension). As such, the tram platform stop underscores how resolving one tension often results in unravelling another tension that in turn also requires attention.

How determinations are made through the course of daily professional duties involves understanding how actors respond to and against technology. Although *SmartRoads* provides transport planners with a transparent process to help resolve the network

tension, resolution still requires making normative decisions. The Network Fit Assessment Tool played a central role in help to make such normative decisions. Yet, a more concise representation and accounting for how and why the constituted elements intersected in the manner they did during the NOP exercise, involves tracing the contours of materiality. The Tool provided a mechanism to illustrate ideas, concerns, arguments and solutions as understood and conveyed by actors. As such, successful resolution to the network tension via *SmartRoads* occurs from knowledgeable actors reacting to and against, the Tool.

In summary, accounting for materiality has provided new insight to understand how transport planning practice is constrained and constituted. This further underscores the value and further need for building stronger bonds between technology and science studies and urban studies more generally (Coutard & Guy, 2007), and between scholars and practitioners specifically (Evans, et al., 1999).

9.3 Contribution to knowledge

It was mentioned in Chapter 1 that in thinking about road space allocation, one might expect to begin by examining existing academic literature pertinent to the topic of transport planning. As has been made clear in this thesis, this route is problematic for a variety of reasons. As such, this thesis makes four modest yet significant contributions of knowledge to urban studies. First, this thesis is one of the first to draw from the sociology of scientific knowledge and wider body of studies of technology and science literature to examine the transport planning profession. Second, in doing so, this thesis demonstrated the strength of drawing from theories of materiality to analyse transport planning. Third, following from these two points, this thesis is also one of the first to examine such issues within a mobilities paradigm. Fourth, following from the third point, situating a research programme within a mobilities paradigm afforded the opportunity to examine complex mobility challenges from the perspective of road space allocation. Each one of these points is briefly expanded on below.

It was noted in Chapter 2 that Evans, Guy and Marvin (1999) suggest that adopting insight from sociology of scientific knowledge can help reposition complex urban infrastructure debates. This thesis has shown how this might be accomplished by drawing more generally from technology and science studies (Biagioli, 1999; Hackett, et al., 2008; Jasanoff, et al., 1995), and in particular sociology of scientific knowledge (Collins & Evans, 2002; Pickering, 1995). Drawing insight from sociology of scientific knowledge has been found to develop a new frame to look at issues related to

transport planning, road space allocation and the role of different agents (e.g. actors and infrastructure). Additionally, drawing insight from the sociology of scientific knowledge helped to overcome such philosophical conflicts related to different theoretical accounts of transport planning with respect to specific urban study streams. Findings drawn from this research therefore substantiate the need to incorporate theories, methods and concepts contained under the wider cannon of science and technology studies (Coutard & Guy, 2007; Gieryn, 2002; Hommels, 2005). In particular, the academic stream of sociology of scientific knowledge contained under this cannon played a central role in helping to construct a conceptual framework to examine intersecting animate and inanimate elements, and thus to gaining a deeper understanding of how transport planning is constrained and constituted (Figures 2.3 and 9.1).

Second, this thesis also contributes to the urban studies literature by demonstrating the strength and usefulness of incorporating theories of materiality to analyse transport planning. Accounting for both animate and inanimate elements in analysis was identified in Chapter 1 as core aim of the mobilities paradigm. As outlined in Chapter 2, only recent historical urban studies—which specifically draw from studies of technology and science—are found to incorporate materiality into analysis (Ehrenfeucht & Loukaitou-Sideris, 2007; Mcshane, 1999; Norton, 2008). Such studies by their nature are historical. Thus, a gap was identified with regard to examining road space allocation in contemporary settings. Drawing insight from sociology of scientific knowledge provided for a new approach to look at issues related to transport planning, road space allocation and the role of different agents (e.g. actors, infrastructure, etc.). Tracing the contours of materiality, therefore, provided an enhanced understanding of how transport planning is constrained and constituted. Decisions can be shaped by how actors interpret the built fabric, infrastructure can provide physical reminders of past mobility controversies and action can be influenced by how actors physically respond to and against technology. Findings from this study clearly indicate the value of tracing the contours of materiality is its ability to provide for an improved and more realistic picture of professional practice.

Third, this research programme examined the above issues within a mobilities paradigm (Urry, 2008). A ‘mobility turn’ (Sheller & Urry, 2006a) has been suggested as indicating a stable new paradigm building from a diverse set of disciplines ranging from anthropology and migration to geography, transport studies, and sociology. For example, though topics such as mobility, movement, space and place remain

geography's bailiwick, a recent edited book entitled *Geographies of Mobilities: Practices, Spaces, Subjects* (Cresswell & Merriman, 2011) brought together academic geographers to actively engage with the mobility turn. In this light, this thesis has demonstrated that the homogenised term of mobile is insufficient to develop new ontologies and epistemologies required to develop a more realistic picture of how society and technology intersect. As such, the heterogeneous view of the social world provided by the mobilities paradigm was central to developing what in this thesis was identified as the scientific world of transport planning. This opened up useful exploratory lines of inquiry to understand the ways in which the work of transport planners (i.e. animate) allocating road space (i.e. inanimate) is constrained and constituted. As such, this helped to reveal limitations of governance, policy frameworks and professional knowledge in allocating road space.

Fourth, an overall contribution of this thesis to urban studies lies within analysing complex mobility challenges not from the perspective of the car, but as one of road space allocation. Identifying road space allocation as the topic of inquiry, and situating the topic within the mobilities paradigm, is a novel approach to understand the science of transport planning, and contemporary transport planning problems. In doing so, this study demonstrated the value in understanding mobility as one of road space allocation. Just as the car is intractably interwoven into urban society, road space allocation tensions are intractably interwoven with one another. Thus, resolving one tension impacts how another tension is resolved or otherwise. As road space allocation is not a traditional topic of inquiry in transport planning, examining road space allocation at the scale presented in this thesis is novel. Importantly, this afforded the opportunity to elucidate aspects of road space allocation.

Chapter 10 – Conclusion

This study has provided a critical investigation into how transport planners allocate road space in Melbourne. In so doing, it has provided new insight and knowledge in which to understand how transport planning is constrained and constituted.

10.1 Elements that determine and shape road space allocation

At the outset, the research question driving this inquiry has been to examine how different animate and inanimate elements intersect to determine and shape road space allocation. In answering this question, four objectives were proposed and their resolution is commented upon in the sections that follow the objectives.

- to identify and examine rules that govern and guide road space allocation
- to explore professional norms and conventions that facilitate and constrain road space allocation;
- to analyse how infrastructure influences road space allocation; and
- to analyse when, why and how a demand management stance has been applied in road space allocation.

10.1.1 Rules that govern road space allocation

Governance for road space allocation in Melbourne has changed very little over the past century. Local government participation in allocating road space at the metropolitan level is extremely limited. Legislatively set road classifications play a critical role in determining policy boundaries. The classifications help explain why state authorities have a more substantive role in allocating road space at the metropolitan level. State road authorities are therefore dominant in road space allocation. Changes in VicRoads signal this dominance has both positive and negative implications.

State government political agendas have a persistent and significant presence in shaping mobility visions for how road space is allocated in Melbourne. For example, techniques and processes developed in the 1980s were dropped during the 1990s under a powerful mobility vision developed by the Kennett government, only to resurface during 2000. A mobility vision centred on freeway construction under the most recently elected Liberal Government suggests this cycle continues. As such, momentum needed to entrench the demand management stance at institutional levels is found to be constrained by cyclical and/or alternating mobility visions generated from constant change in state government in Victoria.

Unlike with land use and public transport planning state authorities, VicRoads has remained a single-purpose authority since its creation in 1989. Persistent restructuring to state planning authorities results in the incremental loss of organisational knowledge. Impacts from organisational restructuring are cumulative; therefore, implications for how future mobility challenges are engaged are more significant than administrative. In addition to loss of institutional knowledge, increased privatisation of transport planning continues to shift valuable expertise into the private sector and away from the public sector. This compounds issues related to lost institutional knowledge. Given the today's complex mobility challenges, governance, premised on local and state delineations or transport modes, are incongruous to resolve today's complex mobility challenges that face practitioners and policymakers.

10.1.2 Professional norms and conventions that facilitate and constrain road space allocation

Traffic engineering remains deeply entrenched into multiple aspect of transport planning practice. The dominance is not specific to traffic engineering per se, but to its evolution as a profession alongside the car. Transport planners indicated a strong desire to engage, listen and incorporate divergent opinions and viewpoints. Today's complex mobility challenges require incorporating knowledge held by multiple disciplines, including traffic engineering. However, policy levers, funding mechanisms and organisational, project and process performance criteria collectively reflect a very deep institutionalisation of traffic engineering. Consequently, successful use of strategic processes, even by non-traffic engineering professionals, and without altering traffic engineering criteria, discourages creation of new knowledge.

Complex mobility challenges are not presented as self-evident. Instead, publically defined problems, depending on organisational conventions, result in professionals either ignoring or engaging the public in protracted discussions. This engagement results in practitioners embodying knowledge and experience, making organisational conventions and professional relationships crucial to 'black-boxing' a demand stance. Transport planners with multiple-authority experience provide important information conduits to help a contact in one authority navigate complex bureaucratic arrangements to locate a contact in another authority. Consequently, local and state transport planners having multi-authority experience indicate informal stopgap measures to rectify lost knowledge from organisational restructuring and outsourcing of staff and work to the private sector.

10.1.3 How infrastructure influences road space allocation

Lack of attention to materiality represents a significant lacuna in studies of transport planning practice. Developing new professional knowledge and practices critical to engraining a demand management stance in practice is found to be informed and enacted through practitioners actively engaging, and/or reacting to and against, technology and infrastructure. This demonstrates tracing the contours of materiality can provide for an improved and more realistic picture of professional transport planning practice.

Examining the relationship between actors and materials requires building stronger bonds between science and technology literature and urban studies literature (Coutard & Guy, 2007). Mobility controversies examined in this thesis were found to be derived from a complex intersection between knowledge, technology, and society (Evans, et al., 1999). Questions therefore remain as to whether yellow Fairway lines, tram platform stops and road corridor projects will provide allegories for how road space can be re-allocated, or simply remain powerful physical reminders of adhoc attempts to engage complex mobility challenges. Regardless, though smaller in scale to freeways, such examples illustrate how obdurate inanimate objects provide powerful physical reminders of past mobility controversies.

10.1.4 Demand management stance and road space allocation

Governance between local and state governments in Victoria set the stage for future mobility challenges, but not for how conflicts are resolved. There is a deep legacy of state governments to give only partial support for road measures aimed directly at the car, and almost no political support for developing a policy package of push–pull road measures. This legacy continues to shape how transport planning more generally, and road space allocation in particular, is conducted in Melbourne.

Resolution to multiple tensions that make allocating road space a challenging endeavour is cyclical in nature. The recent rise of the network perspective towards allocating road space by VicRoads is best understood as a reaffirmation of this cyclical nature, as well as seeds for a potentially more robust approach to reconciling multiple tensions; one that can potentially help to destabilise the dominant car paradigm. Specifically, adoption of a demand stance through application of Network Operating Plans, badged under the heading *SmartRoads* (VicRoads, 2010a), indicates a real move towards the potential to ‘black box’ a demand stance in transport planning.

SmartRoads has the potential to provide professionals at the coal face of transport planning viable methods and techniques to help resolve the wicked problem of mobility. Wicked problems by definition cannot be solved in the sense that there is one answer, but instead are reproblematised and resolved over and over again (Head, 2008). Specifically, its two key strengths are flexibility and transparency. It can be applied to any road network and provides transparent principles that help translate conflicting ideas to reach consensus. In essence, engaging *SmartRoads* resolves, rather than solves, complex mobility challenges. This helps translate conflicting ideas to develop consensus, even if consensus does not address specific needs, and helps get road space allocation done. Yet, in its current configuration, *SmartRoads* prioritises liveability for residential roads over more heavily trafficked roads. This normative determination means significant scope exists to re-conceptualise road space allocation as integrating mobile and non-mobile activities (Anderson, 1978). As such, the efficacy of transport planning to guide Victoria's urban mobility system towards a different future has yet to create a mobility vision that accounts for all types of road space. Until such time, it appears that for now, engaging complex road space allocation tensions involve some roads always being classified as less important.

10.2 Implications for policy

In examining how transport planners allocate road space in Melbourne, this research has sought to make a contribution to debates found in traditional studies of transport planning. As such, a significant contribution from this research is elucidating how transport planning processes are shaped and constituted.

The overwhelming majority of transport planners interviewed believed that the idea of constructing large freeways to resolve complex mobility issues had come to an end. However, the election that resulted in voting Labor out of office and returning clearway operating hours also ushered in a new Liberal Government, and subsequently a new mobility vision. Whereas construction of the East-West Link appeared a cautionary tale in early 2004 (Silkstone & Millar, November 7, 2005; *The Age*, November 8, 2005), the state government is once again advocating freeway construction as a means to address future mobility needs (Carey, August 8, 2013). This highlights how complex mobility challenges can quickly become politicised. Importantly, clearways around Melbourne's CBD remain un-standardised, just as they were when Labor was in office.

SmartRoads outlines a transparent set of principles that provide an essential avenue for transport planners to manoeuvre through a thicket of thorny institutional and political

issues. Given that Melbourne's multi-modal public transport system primarily operates on the same constrained road space used by motorised and non-motorised vehicles, *SmartRoads* has an opportunity to transition transport planning practice towards a new and more sustainable mobility vision. Yet, similar to the process created during the 1980s and 1990s, *SmartRoads* has yet to be integrated into VicRoads organisational conventions and business models. Road measures identified still involve VicRoads staff locating funding based on traditional transport criteria. Consequently, senior VicRoads decision makers view the process as a technique to help locate efficiencies in Melbourne's larger road network to improve travel flow, instead of a mechanism to allocate road space at the metropolitan scale to reduce car travel.

Build on this point, another insight that emerged from interviews was conflicting understandings of 'constrained space'. Conflicting interpretations of constrained space reflect conflicts associated with the narrow view of mobility created by the dominant car paradigm. This narrow conceptualisation determines what is, and what is not, defined as road space. The putative definition of road space reflects more traditional definitions (i.e. the space between buildings absent alleyways and footpaths). This in turn provides for a very limited purview in practice and policy ambit to redress mobility challenges. For example, riding a bicycle within Melbourne one can encounter an array of explicit and ambiguous spaces intended for the bicycle. During a single journey one might ride on road space both with and without a bicycle lane, and encounter parks that both allow and prevent bicycles from riding on footpaths. On the one hand, how road space is allocated generates the conflicting spaces a bicyclist might encounter as they cross multiple local municipal jurisdictions. On the other hand, such outcomes are also the direct result of a narrow conceptualisation of mobility. This conceptualisation is deeply supported by governance. Whereas VicRoads is responsible for declared road space, local governments are responsible for undeclared road space as well as footpaths. As local councils view urban space from their specific local perspective, the governing arrangements result in viewing cross-jurisdictional bicycle journeys as self-contained to space within the municipality. From the perspective of a bicyclist, this results in encountering different space and the opportunity for potentially large fines for riding in a park that prohibits bicycles sharing a footpath with pedestrians.

Consensus between public state authorities and private transport operators to agree to a definition of tram priority, and subsequently test tram priority, has only very recently occurred. The trial marks a greater willingness to implement tram priority, and a first

for consensus as to the definition of 'tram priority'. Continued low funding levels to cover annual maintenance of Melbourne's multi-modal public transport network limits the potential for projects aimed at giving non-car modes greater priority. This calls into question how future tram priority trials such as those examined in this thesis will reduce car-reliant travel. The lack of hardware (i.e. computer models, funding arrangements) to support software (i.e. organisational conventions, professional knowledge), provides insight into why the testing of ideas is critical. For example, as part of a submission to the Moreland Council for a redevelopment, a consultant conducted a traffic study to measure the redevelopment's potential impacts to the road network. In listing the traffic model's assumptions, the consultants found that in regard to part-time tram lanes, site observations documented "very low compliance" by motorists. Based on the observations, the consultants decided not to incorporate the tram road treatments into the traffic model (Turnbull & Thompson, 2009, p. 15). The tacit acceptance of poor compliance legitimises motorists have a low compliance record. In turn, the traffic model reflects the latent inclusion of several normative decisions by the consultants.

Conflicts in professional transport planning identified in this research mirror, in many ways, current debates found in the urban studies literature (for example, see Wigan, 2011: Special Issue: Other ways of looking at transport planning). A core tenet underpinning urban planning since its inception has been to actively guide or steer urban systems towards a future based on yielding benefits that result in a better future had planning not intervened (March, 2012). Transport planning is now being forced to engage questions around how to guide urban mobility systems towards a future, when consensus has yet to be reached around a future vision or direction.

Part of the challenge facing scholars is helping professionals re-imagine road space. Scholars have a significant role in helping to translate what 'many space-time geographies' means for professional practice (Friedmann, 1993). As demonstrated in Chapter 9; instead of seeking an ideal process, attention would be better spent looking across the wide variety of existing processes. Organic theories of road space rearticulate road space as more than space containers independent of temporal characteristics, and mobility as more than time containers independent from either space or place. Consequently, traffic engineers can learn much from Ellis' (1978) "felt volume" concept and urban designers can learn much from the public transport network literature (Dodson, et al., 2011; Nielson, et al., 2005).

10.3 Future research

The focus of this thesis was to examine how animate and inanimate elements intersect to shape and determine how road space is allocated in Melbourne, Australia. Given both the topic as well as the specific case study, there is a range of related avenues in which to understand and analyse the science of transport planning apart from the approach applied here.

Findings drawn from analysing transport planning principally drew from document analysis, semi-structured interviews and some participant observation research methods. Future research could explore the practice of transport planning in more detail by drawing more heavily on participant observation as a core research method. As noted in Chapter 3, the original aim of conducting non-participant observations was to document a before and after account of road space allocation. Yet, for various reasons, this objective had to be significantly pulled back. As such, there remains significant scope in which to more robustly apply participant observation as a core research method to further refine how actors engage and react to and against technology, through the course of their professional lives.

Attributes that make Melbourne a critical case study constrain generalising findings. Limitations to generalising findings can be offset by stronger capacity for theory building (Bryman, 2008). As demonstrated, drawing from studies of science and technology provided useful exploratory research to identify factors using a new framing and approach. This in turn advanced and added materially to what the transport literature has previously provided on this topic, in areas which been suggested by others (principally in non-urban studies literature), but which confirmatory explorative research had not yet been conducted. Yet, there are limitations a case study.

The Scandinavian approach to road space allocation is quite different compared to that in Melbourne. Hass-Klau (1990) has previously documented how the Dutch took Buchanan's theoretical ideas of traffic calming at face value and actively chose to translate theory into reality. This resulted in advancing a European approach to traffic calming often referred to as shared space (Hamilton-Baillie, 2004; Hass-Klau, 1990). Thus, scholars often distinguish traffic calming and shared space (Karndacharuk, et al., 2014). In the UK, shared space programmes began around 2000 under *Mixed Priority Routes* (DfT, 2008). Similar work began in North America around 2000 under *Context Sensitive Solutions* (ITE, 2006; TRB, 2004). As elaborated in Chapter 7, in Australia, research into shared space occurred during the late 1980s (Armstrong, et al., 1992).

Subsequently, shared space in Australia has remained focused and contained to the corridor-level (Armstrong, et al., 1992; NSW RTA, 2000; NSW RTA & FORS, 1993). Contemporary exemplars of this merging are found in *Activity Corridors* (Curtis & Tiwari, 2008) and in the UK under *Link and Place* (Jones, et al., 2007). Social as well as institutional differences help explain the Dutch's readiness to pioneer road space allocation techniques such as Woonerf. Consequently, it is acknowledged that examining aspects of Scandinavian and Dutch practice through a comparative study could reveal strengths and weaknesses to Anglospherical notions around use of road space more generally, and road space allocation in particular.

In relation to methodology as outlined in Chapter 3, it is also important to note that this thesis adhered to constructivist ontology. As noted in Chapter 2, this worldview is significantly different to that proposed by other theories such as developed in actor-network theory (Latour, 2005). The relational worldview advanced by actor-network theory philosophically aligns with the mobilities paradigm and sociology of scientific knowledge. As such, there is merit in conceptually understanding how transport planners (i.e. actors) are symmetrically related with technology and infrastructure (i.e. materiality). Aside from issues noted in Chapter 3 regarding this approach, this line of inquiry clearly has implications in conceptualising the science of transport planning.

Aside from actor-network theory, other relational theories such as that contained under the wider umbrella of 'theories of practice' (Shove, et al., 2012), have begun to explore and examine transport planning (Cass, et al., 2004). Most notable being Watson (Watson, 2012), who demonstrated how conducting benign daily practices such as grocery shopping are supported by a range of co-dependent and evolving set of bundled practices, which include but are not limited to, the car and existing mobility networks. Though such a relational view of the world has significant insight which the urban studies literature can draw from, more work is required if scholars are to decentre the individual and shift their focus to understanding the science of transport planning as intersecting separate yet related and intertwined sets of practices.

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Appendix 1 – Council A Census information

Based on a review of the 1996, 2001 and 2006 censuses, the town of Council A represents, what can be classified as a stereotypical mid-range Metropolitan suburb. Council A contains two train lines and a few bus routes. Its population is over 80,000, evenly split between male and female, with over 50,000 born in Australia and which speak English as the first language. Over 2/3 of the total dwelling units comprised within Council A are single-family detached housing, consisting of two to four bedrooms, which provide shelter to over 2/3 of the total population. Over half of Council A's population is married with at least one child, with most families owning between 1 to 3 motor cars, or at least one car for every single-family detached dwelling. According to the recent census, 75% of journey to work travel out of Council A was completed by single-motor car drivers, which increases to over 85%, when the variable "passenger of a motor car" is included (DOT, 2012).

Although Council A's population has remained relatively unchanged when compared to previous 1996, 2001 and 2006 censuses, two trends have recently emerged, which provided some of the rationale for council to seek VicRoads' assistance. The first trend relates to growth in high-end employment categories for Council A's residents, occurring primarily in professional and manager employment areas, the result of which hints at increases in family income. This first trend also suggests that some gentrification is occurring with small pockets of Council A. The trend corresponds with the second change occurring to the forecasted changes slated to significantly alter Council A's wider urban morphology, based principally on large residential growth projected to occur on several un-used industrial sites located within Council A. Collectively, the two trends provided the motivation, for Council staff, to devise a more long-term strategic plan, for how Council A was to expand over the next several decades.

Appendix 2 – Ethics forms

A2.1 Plain language statement for interviews



Design and Social Context Portfolio
RMIT Centre for Design

Defining Spatial Planning Through Practice

Dear -

My name is Ian Jones. I am a postgraduate student completing a PhD at RMIT University. My senior supervisor is Dr. Robin Goodman, Director of the AUHRI RMIT Research Centre.

My research concerns spatial planning in general, specifically exploring the Clearways and No-Standing parking policies in use around Melbourne. Roughly 50 practitioners from a range of state and local government departments will be invited to participate. As someone identified as having a role in the above policies, I invite you to share your experiences. Interview questions will only cover the daily tasks and actions directly related to your job, and will not cover topics of a sensitive nature. Interviews involve:

- Being interviewed by myself. With permission, interviews will be recorded with a digital voice recorder to take place at a time, date and location suitable to you (eg: work location and/or coffee shop). The interviews will last approximately one hour.

All documentation will be treated confidentially and not used for any other purpose outside of the research. Should you agree to take part, you are free to withdraw at any time you wish. If you do withdraw, all information obtained from you will be destroyed and not used in this, or any other research project. All data will be kept for a maximum of 5 years and stored securely on University premises. No one other than myself will have access to the raw or coded data.

The research findings may be presented at conferences and published in academic journals. Use of non-identifying codes for data collected will ensure individual identities remain concealed (eg: fake names for specific quotes), and any results published will generally be at the aggregate level. You can request a copy of the interview transcript, and/or a summary of the research findings when they are finalised.

Please feel free to contact me at any time if you have any questions or concerns, or if you would like to discuss any aspect of this research.

Thanks for your time!

Mr Ian Jones, BSc, MURP
RMIT University
GPO Box 2476V
Melbourne VIC 3001
Ph 03 9925 9095
Email ian.jones@rmit.edu.au

Any complaints about your participation in this project may be directed to the Executive Officer, RMIT Human Research Ethics Committee, Research & Innovation, RMIT, GPO Box 2476V, Melbourne, 3001. Details of the complaints procedure are available at: http://www.rmit.edu.au/rd/hrec_complaints

RMIT University

Version 3: 1 July 2010

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A2.2 Consent form for interviews



DSC PORTFOLIO

RMIT HUMAN RESEARCH ETHICS COMMITTEE

Prescribed Consent Form For Persons Participating In Research Projects Involving Interviews, Questionnaires, Focus Groups or Disclosure of Personal Information

PORTFOLIO OF
SCHOOL/CENTRE OF

Design and Social Context

Global Studies, Social Science, and Planning

Name of participant:

Project Title:

Defining Spatial Planning Through Practice

Name(s) of investigators: (1) **Ian Jones** Phone: **03 9925 9095**
(2) _____ Phone: _____

1. I have received a statement explaining the interview involved in this project.
2. I consent to participate in the above project, the particulars of which - including details of the interviews - have been explained to me.
3. I authorise the investigator to interview me.
4. I give my permission to be audio taped ☐ Yes ☐ No (delete if inapplicable)
5. I give my permission for my name or identity to be used ☐ Yes ☐ No
6. I acknowledge that:
 - a) Having read the Plain Language Statement, I agree to the general purpose, methods and demands of the study.
 - b) I have been informed that I am free to withdraw from the project at any time and to withdraw any unprocessed data previously supplied.
 - c) The project is for the purpose of research and/or teaching. It may not be of direct benefit to me. The privacy of the information I provide will be safeguarded. The privacy of the personal information I provide will be safeguarded and only disclosed where I have consented to the disclosure or as required by law. If I participate in a focus group I understand that whilst all participants will be asked to keep the conversation confidential, the researcher cannot guarantee that other participants will do this.
 - d) The security of the research data is assured during and after completion of the study. The data collected during the study may be published, and a report of the project outcomes will be provided to all project participants (if they wish to receive it). Any information which may be used to identify me will not be used unless I have given my permission (see point 5).

Participant's Consent

Name: _____ Date: _____
(Participant)

Name: _____ Date: _____
(Witness to signature)

Participants should be given a photocopy of this consent form after it has been signed.

Any complaints about your participation in this project may be directed to the Executive Officer, RMIT Human Research Ethics Committee, Research & Innovation, RMIT, GPO Box 2476V, Melbourne, 3001. Details of the complaints procedure are available at: <http://www.rmit.edu.au/governance/complaints/research>

A2.3 Plain language statement for participant observation



Design and Social Context Portfolio
RMIT Centre for Design

Defining Spatial Planning Through Practice

Dear -

My name is Ian Jones. I am a postgraduate student completing a PhD at RMIT University. My senior supervisor is Dr. Robin Goodman, Director of the AUHRI RMIT Research Centre. My research explores how planners allocate roadway space. Roughly 50 practitioners have been interviewed regarding use of Clearways.

The interviews revealed how Network Operating Plans (NOP) "Smart Roads" were assisting stakeholders understand trade-offs when re-prioritising roadway space. To corroborate interview data and construct a more realistic picture of planning practice, a second research stage involves non-active observation of an NOP planning exercise. As someone involved in an NOP exercise, I seek the following:

- Being interviewed by myself pre/post the NOP exercise. Not all participants will be interviewed individually. If you are chosen to be interviewed, questions will only cover your daily tasks and actions related to the NOP exercise. With permission, interviews will be recorded with a digital voice recorder.
- Non-active observation and taking field-notes of NOP meetings. The focus is not on individual participants, but with how problems and solutions are formulated and the overall decision-making process employed. With permission, observations will be recorded with a digital voice recorder.

All documentation will be treated confidentially and not used for any other purpose outside of the research. Should you agree to take part, you are free to withdraw at any time you wish. If you do withdraw, all information obtained from you will be destroyed and not used in this, or any other research project. All data will be kept for a maximum of 5 years and stored securely on University premises. No one other than myself will have access to the raw or coded data.

The research findings may be presented at conferences and published in academic journals. Use of non-identifying codes for data collected will ensure individual identities remain concealed (eg: fake names for specific quotes), and any results published will generally be at the aggregate level. You can request a copy of the interview transcript, and/or a summary of the research findings when they are finalised.

Please feel free to contact me at any time if you have any questions or concerns, or if you would like to discuss any aspect of this research.

Thanks for your time!

Mr Ian Jones, BSc, MURP
RMIT University
GPO Box 2476V
Melbourne VIC 3001
Ph 03 9925 9095
Email ian.jones@rmit.edu.au

Any complaints about your participation in this project may be directed to the Executive Officer, RMIT Human Research Ethics Committee, Research & Innovation, RMIT, GPO Box 2476V, Melbourne, 3001. Details of the complaints procedure are available at: http://www.rmit.edu.au/rd/hrec_complaints

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RMIT University

Version 3 NOP: 16 November 2011

A2.4 Consent form for participant observation



DSC PORTFOLIO

RMIT HUMAN RESEARCH ETHICS COMMITTEE

Prescribed Consent Form For Persons Participating In Research Projects Involving Interviews, Questionnaires, Focus Groups or Disclosure of Personal Information

COLLEGE OF
SCHOOL/CENTRE OF

Design and Social Context

Global Studies, Social Science, and Planning

Name of participant:

Project Title:

Defining Spatial Planning Through Practice

Name(s) of investigators: (1) **Ian Jones** Phone: **03 9925 9095**
(2) _____ Phone: _____

1. I have received a statement explaining the interview and non-active observation involved in this project.
2. I consent to participate in the above project. I am aware that the investigator's non-participant observation role in the NOP planning meetings involves observing, documenting and recording notes about the content of the discussions and deliberation process involved in the NOP planning meetings.
3. I authorise the investigator to interview me. (if chosen to be interviewed)
4. I give my permission for the interview to be audio taped ☐ Yes ☐ No (if chosen to be interviewed)
5. I give my permission of NOP meetings to be audio taped ☐ Yes ☐ No (determined at start of each meeting)
6. I give my permission for my name or identity to be used ☐ Yes ☐ No
7. I give permission for observation and fieldnotes of NOP planning exercise meetings ☐ Yes ☐ No
8. I acknowledge that:
 - a) Having read the Plain Language Statement, I agree to the general purpose, methods and demands of the study.
 - b) I have been informed that I am free to withdraw from the project at any time and to withdraw any unprocessed data previously supplied.
 - c) The project is for the purpose of research and/or teaching. It may not be of direct benefit to me. The privacy of the information I provide will be safeguarded. The privacy of the personal information I provide will be safeguarded and only disclosed where I have consented to the disclosure or as required by law. If I participate in a focus group I understand that whilst all participants will be asked to keep the conversation confidential, the researcher cannot guarantee that other participants will do this.
 - d) The security of the research data is assured during and after completion of the study. The data collected during the study may be published, and a report of the project outcomes will be provided to all project participants (if they wish to receive it). Any information which may be used to identify me will not be used unless I have given my permission (see point 5).

Participant's Consent

Name: _____ Date: _____
(Participant)

Name: _____ Date: _____
(Witness to signature)

Participants should be given a photocopy of this consent form after it has been signed.

Any complaints about your participation in this project may be directed to the Executive Officer, RMIT Human Research Ethics Committee, Research & Innovation, RMIT, GPO Box 2476V, Melbourne, 3001. Details of the complaints procedure are available at: <http://www.rmit.edu.au/governance/complaints/research>

Appendix 3 – Legislative Acts

	Act	Level	Authority	Structure/Body	Objective	Function	Other elements related to roadway priority treatments
1890 Local Government Act	An Act to consolidate the Laws relating to Local Government.	Local	Local Councils (Melbourne)		Part VII.— Government of Municipalities By-laws Regulations and joint regulations Division 2.—by-laws regulations and joint regulations. (I) May be made, for what Purposes.	191. Subject to the provisions hereinafter contained by-laws may be made for any municipality for the purposes mentioned in this Act and for the purposes following:— (Provided local council power to regulate through by-laws)	(xiii) Controlling, managing and preserving "commons" and public reserve. (xv) Preserve public decency and general health of residents ((xvii)Regulate animal storage to minimise injuring footpaths/pedestrians (xix)Traffic and processions
1903 Local Government Act	An Act to consolidate and amend the Laws relating to Local Government.	Local	Local Councils		Part VII.— Government of Municipalities By-laws Regulations and joint regulations Division 2.—by-laws regulations and joint regulations. (I) May be made, for what Purposes.	197. Subject to the provisions hereinafter contained by-laws may be made for any municipality for the purposes mentioned in this Act and for the purposes following:— (Provided local council power to regulate through by-laws)	(18) Prohibiting spitting or expectorating on footpaths (27) Prohibiting or regulating cattle being allowed to graze or wander upon any land not enclosed by a substantial fence:
1909 Motor Car Act	An Act to regulate the use of Motor Cars.	State	Governor in Council			15. (1) The Governor in Council may make regulations: Travel on public highways; Motor car identification; Noise minimisation Regulate/restrict travel (e.g. Sunday, near churches); Declare speed limits; require municipal councils to post signage; license	
1912 Victorian Country Roads Acts	An Act relating to Country Roads	State Corporate Body	Established Country Roads Board	3 member board Appointed by governor in general	Part II – Main Roads 18(1) Power of CRB Determine main roads; Victorian metals, minerals and materials suitable for the road construction/ maintenance; Effective road construction methods and maintenance; Facilitate communication and improve travel; Record and publish investigation results; Purchase all land, machinery, tools, and materials to successfully accomplish Act	Power to declare highways with approval by Governor in Council Power of review over councils to ensure road improvements, construction and maintenance within council boundaries. 18(2) Confirmation by Governor in Council 18(4) Councils to be consulted before declaration of main road or making deviation	1st time: Power to declare "main roads"
1914 Local Government Act	An Act to further amend the Local Government Act 1903 and for other purposes.	Local	Local Councils		25 (1) To the purposes for which by-laws may be made under section one hundred and ninety-seven of the Principal Act there shall be added the following:—	Amended and added additional by-laws 197:	- Prohibiting or minimising noises in any public highway including the prohibition or the regulation of the use on vehicles of brakes which are calculated to cause noise. - Regulating the driving of cattle in or along any specified streets in the municipal district. - Prohibiting the deposit of refuse or rubbish on or requiring the removal of refuse or rubbish from streets roads lanes or passages or any land.
1918 Melbourne and Metropolitan Tramways Act	An Act relating to Metropolitan Tramways and for other purposes	State Corporate Body	Established Melbourne and Metropolitan Tramways Board	7 member board appointed by governor in general	Creation of Board to execute Act	Board to construct and operate future tramways Board to prepare general scheme for future tramways	

Appendix 3 Summary of Legislative Acts

1921 Local Government Act	An Act to amend the Local Government Acts.	Local	Local Councils			10. To the purposes for which by-laws may be made under section one hundred and ninety-seven of the Principal Act there shall be added the following:—	Municipalities were given power to zone land for residential use.
1922 Metropolitan Town Planning Commission Act	An Act to make provision for a Metropolitan Town Planning Commission	State Authority	Established Metropolitan Town Planning Commission	9 member board appointed by governor in general: (1) Melbourne councillor (4) Different municipal councillors (4) Qualified in business, technical, professional matters	To recommend and guide Melbourne's development. Make inquiries and report upon present conditions and tendencies of urban development in the metropolitan area Reports to include:		Seminal planning body at metropolitan scale. The State Government became involved with land use planning in the 1920s in response to pressure from town planners for improved land use and better co-ordination of services.
1928 Local Government Act	An Act to consolidate the Law relating to Local government	State	Established "standing places" for motor cars		(7) (a) Purposes for which by-laws may be made under sub-section (1) of this section there shall be added the (i.) Appointing in streets and roads including any portions of streets - standing places for motor cars Rick Clapton's PhD (page 163), the 1928 Local Government Act spoke to Standing Places for Motor Car Local Government Act 1928 (no. 3590). I was unable to locate the act, but found it discussed in this act.	(ii.) providing for openings through any such standing places for any purpose prescribed by the by-law or for cross traffic ; (iii.) prescribe conditions (days, hours) (iv.) regulating use of standing places (number of motor cars, etc.) (v.) prohibit occupation by motor cars of any openings through such standing places (pg. 943).	Regulation of car traffic, and the need to prohibit cars passing stopped trams (in notes on pages 938-939). This was specifically discussed with regard to the 1915 Motor Car Act and the municipal regulation which had previously discussed that cars should slow down to the speed of a crawl as opposed to actually coming to a complete stop during tram boarding and alighting.
1932 Transport Regulation Act	An Act to make provision for the Appointment of a Transport Regulation Board and the Powers and Duties thereof.	State Corporate Body	Created Transport Regulation Board	5 member board appointed by governor in general: (1) Chairman (1) Victorian Railways Commissioner (1) motor interest representative (1) primary producer (1) commercial representative	Board to make recommendations in respect of co-ordination of transport	Provide Governor in Council reports on how to improve better and more economic co-ordination or the better regulation and control of railway, tramway, motor, sea and air transport.	
1935 Road Traffic Act	An Act to make Provision with respect to the Control of Traffic on Roads.	State Authority	Created Traffic Advisory Committee	Committee appointed by governor in council. Committee was between 3-7 members and were local councillors.	Committee to consider and report to and advise the Governor in Council upon all matters related to transport.		
1936 Country Roads Act	An Act to validate certain payments made from the Country Roads Board Fund and to amend the Country Roads Act 1928 and for other purposes	State Authority	CRB		Section 7: In sub-section (1) of section eighteen of the Principal Act after the words " considered a main road " there shall be inserted the words " or on which a tramway has been constructed by the Melbourne and Metropolitan Tramways Board		Clarified "main road" building on power to "declare" roads of significance. This built from work on motor car traffic laws
1944 Town and Country Planning Act	An Act relating to Town and Country Planning	State Authority	Established Town and Country Planning Board	3 member board appointed by governor in general: (1) of the members to be skilled in town and country planning	Board is primarily advisory in nature. Primary objective is to report on planning schemes developed by individual or multiple councils to be submitted to Minister for approval.	Planning schemes completed on by council's volition of by Minister's directive. Minister could direct Board to prepare planning scheme with municipal consultation if council failed to submit plan within 12 months of Minister's directive.	Beginning of "statutory" planning for Victoria. The Board reported to Minister of Public Works. Board helped to initiate Town and Country Planning (Metropolitan Area) Act 1949 to provide Board with additional powers related to developing planning schemes at metropolitan scale. This eventually led to MMBW being primary authority of metropolitan planning.

Appendix 3 Summary of Legislative Acts

	Act	Level	Authority	Structure/Body	Objective	Function	Other elements related to roadway priority treatments
1949 Town and Country Planning (Metropolitan Area) Act	An Act to make Provision for the Preparation of a Planning Scheme under the Town and Country Planning Act 1944 in respect of the Metropolitan Area, and for other purposes.	State Authority	TCP Board and MMBW		Board helped to initiate Town and Country Planning (Metropolitan Area) Act 1949 to provide Board with additional powers related to developing planning schemes at metropolitan scale. This eventually led to MMBW being primary authority of metropolitan planning.	Within three years of Act the MMBW was to submit to the Minister a metropolitan area planning scheme.	Gave authority to MMBW to prepare a metropolitan planning scheme
1951 Transport Act	An Act to establish a Ministry of Transport and to provide for the Better Co-ordination of Transport in Victoria, and for other purposes.	State Authority	Established the Ministry of Transport	Ministry of Transport includes: Minister of Transport Co-ordinator of Transport Offices/employees required	Part I.—Ministry Of Transport: 4. (1) For the purpose of securing the improvement Ministry or development and better co-ordination of railway, tramway, road and air transport in Victoria there shall be a Ministry of Transport under a Minister of Transport who shall be a responsible Minister of the Crown.	The functions of the Co-ordinator of Transport: (a) make reports/recommendations to Minister of Transport in relation to improvement, development, better co-ordination of transport in Victoria; (b) furnish proposals to the Minister of Transport legislation designed to carry into effect such reports and recommendations; (c) report matters in relation to transport whenever required by the Minister of Transport; (d) convene and preside at conferences between the bodies or persons administering various forms of transport in Victoria ; (e) exercise any powers and carry out any duties conferred or imposed on the Co-ordinator of Transport by or under this or any other Act.	
1953 Parking of Vehicles Act	An Act relating to the Infringement of By-laws and Regulations concerning the Parking of Vehicles, and for other purposes.	Local Council	Melbourne Council	Parking infringements occurring only within the municipal district boundaries of Melbourne			Creation of “parking infringement” for car parking “leaving standing” Powers conferred by Part 1 of the Road Traffic Act 1958. Creation of Owner-Onus (O-O), where the onus is placed on the car’s owner with regard to ensuring legal parking.
1954 Town and Country Planning (Metropolitan Area) Act	An Act relating to Town Planning in respect of the Metropolitan Area, and for other purposes	State Authority	MMBW	MMBW given power to be the responsible authority	All local councils were required to observe and enforce any planning schemes completed by MMBW. Any and all local or metropolitan planning schemes must first be approved by MMBW.	Provided similar powers to councils under Local Government Act except for borrowing. Also, with approval of Minister, MMBW may purchase or compulsorily take any land reserved for any public purpose under any planning scheme developed by MMBW.	MMBW provided sole power over all metropolitan area-wide planning.
1956 Road Traffic Act	An Act relating to the Control of Traffic on Roads, and for other purposes	State Authority	Established Traffic Commission	(1) Police (1) CRB officer experienced in traffic engineering (1) MMBW officer experienced in traffic engineering	Abolished the Traffic Advisory Committee.	Provide advice to Governor in Council on all matters relating to regulations within the Act; all matters related to improvement of traffic conditions and control of traffic; and matters referred by Governor in Council.	Commission completed a metropolitan wide study - Metropolitan Street Service Study 1961 – Part 1” The Act provided Governor in Council to make regulations for and control of vehicular animal or pedestrian traffic on streets or roads; Speed of vehicles or animals and by pedestrians and maximum speeds for vehicles; Signage and marking; eliminating causes of danger and of congestion of traffic ; delegating to municipal councils, MMBW, CRB

Appendix 3 Summary of Legislative Acts

							and TRB discretion or power over regulations; and prescribing penalties. Signage/markings consisted of seminal use of "flashing" pedestrian lights and painted lines indicating pedestrian crossing.
1961 Road Traffic (Parking on Railway and Municipal Property) Act	An Act relating to the Parking of Vehicles on Railway and Municipal Property and to amend the Road Traffic Act 1958, Part II of the Railways Act 1958 and Section Five hundred and fifty-five of the Local Government Act 1958.	State Authority and Local Councils	Provided additional powers to local councils		To amend and simplify legal procedures regarding parking regulations.	Parking matters could now be addressed at local level by corresponding council. Local councils were also compelled to indicate clearly to the motorist legal position when parking in council jurisdiction.	"Before 1960, the legal implications of establishing parking areas and the means of regulating them were not clear. Because of delays encountered from the councils implementing by-law enforcement and the lack of clear signing, motorists guilty of parking infractions were unsure of their position" (1969, MTS, Vol 2, Page 16).
Road Traffic (Clearways) Regulation 1965	To provide the clearway regulation	State Authority	To provide the clearway regulation		Described and defined the clearway regulation.		"Clearway" policy established, defined.
1970 Road Traffic (Road Safety and Traffic Authority) Act	An Act to amend the Road Traffic Act 1958 to establish the Road Safety and Traffic Authority, and for other purposes.	State Authority	Established Road Safety and Traffic Authority	Ten members appointed by the Governor in Council — (a) two full-time capacity members (i) Chairman of the Authority (ii) Deputy Chairman of Authority (b) eight in a part-time capacity NOMINATED BY the following: 1) Chief Commissioner of Police (1) CRB & (1) MMBW Chairman Presidents: (1) RACV, (1) Chamber of Automotive Industries (1) Royal Aus. College of Surgeons (1) MAV (1) Victorian Trades Hall Council.	RoSTA replaced Traffic Commission	3c. The functions of the Authority shall be (3c): (a) carry out research and investigation into road accident prevention (b) to promote road accident prevention practices (c) make inquiries and investigations as the Authority considers necessary in the discharge of its functions (d) request council of any municipality to adopt road accident prevention practices which are specified by Authority, and in event of failure of any council to adopt any said practices to advise the Minister of that failure (e) advise the Minister— (i) on road accident prevention policies (ii) on any matter relating to traffic control referred to it by the Minister (iii) on any matter relating to regulations under this Part (iv) generally as to any matter for the improvement of traffic conditions and the control of traffic.	3D (1) Establish and kept in the Treasury fund to be called the " Traffic Authority Fund "; (4) Moneys to the credit of fund applied by Minister on the recommendation of the Authority for — (a) any works or projects calculated to improve road safety or traffic control; (b) for or towards the establishment or improvement of school crossings or pedestrian crossings ; (c) for or towards the construction purchase and installation on any road of traffic control lights (d) administration and carrying out of the functions

Appendix 3 Summary of Legislative Acts

1973 Ministry of Planning Act	An Act to establish a Ministry for Planning and for other purposes	State Authority	Established Ministry of Planning		The Minister for Planning shall administer the Town and Country Planning Act 1961 and any other Acts or enactments the administration of which is vested in or transferred to him and exercise and perform the powers and duties conferred on him by or under the Town and Country Planning Act 1961 or any other Act or enactment.		
1974 Metropolitan Bridges Highways and Foreshores Act	An Act to make Provision concerning Metropolitan Bridges Main Highways and Foreshores, for that and other Purposes to amend the Melbourne and Metropolitan Board of Works Act 1958, the Country Roads Act 1958 and the Local Government Department Act 1958, and for other purposes.	State Authority	CRB		Power to declare, operate, maintain etc. of bridges, roads and highways transferred from MMBW to CRB.		Also transferred MMBW officers overseeing bridges and highways to CRB.
1986 Road Safety Act	1. The purposes of this Act are— (a) to provide for safe, efficient and equitable road use; (b) to improve and simplify procedures for the registration of motor vehicles and the licensing of drivers; (c) to provide for the safe use of recreation vehicles; (d) to ensure the equitable distribution within the community of the costs of road use.						Defined "highway" as (page 2408): Highway" means— ' a street, road, lane, bridge, thoroughfare or other place open to or used by the public for passage with vehicles and includes every carriageway, footpath, traffic island, nature strip and any area provided to separate vehicular traffic on any such street, road, lane, bridge, thoroughfare or other place; and (b) any place that is a highway by virtue of a declaration under sub-section (2) (a). 2(a) is: (2) The Governor in Council may by Order published in the Government Gazette— (a) declare any place or class of places, whether open to vehicles or not, to be a highway or highways for the purposes of this Act

Appendix 3 Summary of Legislative Acts

	Act's Objective	Level	Authority	Structure/Body	Objective	Function	Other elements related to roadway priority treatments
1983 Transport Act	An Act to Re-enact with Amendments the Law relating to Transport including the Law with respect to Railways, Roads and Tramways, to repeal the Country Roads Act 1958, the Melbourne and Metropolitan Tramways Act 1958, the Ministry of Transport Act 1958, the Railway Lands Acquisition Act 1958, the Railways Act 1958, the Road Traffic Act 1958, the Transport Regulation Act 1958, the Melbourne Underground Rail Loop Act 1910, the Recreation Vehicles Act 1973, the Railway Construction and Property Board Act 1979 and certain other Acts, to make consequential amendments to various Acts and for other purposes.	State Authority	Ministry of Transport	Ministry shall consist of: Minister of Transport Director-General of Transport (2) Deputy Directors-General of Transport (Governor in Council); Assistant Directors-General of Transport (Governor in Council) Various Officers	(1951-1983) (1983-1989) (1989-1996) Victorian Railways 1883-1983 Railway Construction Branch, Board of Land & Works 1892-1964 Railway Construction Board 1965-1980 Railway Construction and Property Board 1980-1983 Melbourne Underground Rail Loop Authority 1970-1983 Melbourne and Metropolitan Tramways Board 1919-1983 Transport Regulation Board 1933-1983 Country Roads Board 1913-1983 West Gate Bridge Authority 1966-1982 Road Traffic and Safety Authority 1971-1983 4. (1) The object of the Ministry of Transport is to improve the efficiency and effectiveness of transport facilities and networks to meet Transport needs of the community. Also, separate but related, Introduced infringement for car parking during Clearway times.	Ministry of Transport functions are 4(2): a) Develop, improve/co-ordinate transport service provision b) Formulate transport policies and performance targets c) Develop, co-ordinate, implement/monitor strategic plans and resource budgets for Ministry and Authorities d) Develop, implement/co-ordinate personnel and industrial relations policies for the Authorities; e) Establish quantitative targets to be attained by the Authorities in the exercise of their functions; f) Develop, implement/monitor corporate financial management control techniques; g) Provide specialist property services for the development and sale of property of the Authorities; h) Provide project management services; i) Carry out investigations, promote/undertake research into any matter related to performance of its functions, powers or duties; j) Facilitate user, officer and public involvement in developing policies for improvement, development/better transport co-ordination; k) Buy, sell, lease or hire vehicles or other equipment; l) Lend or otherwise advance money to public or private bodies to assist those bodies to provide, improve or coordinate transport services; m) Assist public or private bodies to construct or improve transport facilities and to provide services ancillary to those facilities; and n) Do anything incidental or conducive to the performance of its object and functions.	In performing object and functions the Ministry of Transport shall have regard to any economic and financial guidelines and criteria established by the Treasurer for the purpose of pursuing efficiency and effectiveness in the use of public sector resources. Officers of the Ministry of Transport shall regularly consult with officers of the Department of Management and Budget in order to ensure that the object and functions of the Ministry of Transport are being performed in a way that is co-ordinated and consistent with similar activities in other sections of the public sector.
			Victorian Transport Directorate & Victoria Transport Borrowing Agency	(Transport) Minister shall appoint a Victorian Transport Directorate: (a) Minister as Chairman; (6) Director-General of Transport as Deputy Chairman; (c) Deputy Directors-General of Transport; (d) Managing Director of each of the Authorities; (e) person nominated by Treasurer (f) others appointed by Minister	Part II, Division 2 (11): Victoria Transport Borrowing Agency: (3) Object of Agency is to efficiently and effectively obtain and manage borrowings for transport in accordance with Government policy. (4) The functions of the Agency are— (a) borrow money for transport purposes whether, principal or as agent for Authority; (b) to lend any money borrowed by the Agency as principal to the Authorities on such terms and conditions as the Agency determines from time to time; (c) Assist Authorities in the planning and management of their borrowings (d) to issue all bonds and to create and issue all inscribed stock issued or created and issued under this Act; and (e) do anything incidental/conducive to the performance of its object and functions	Part II, Division 2 (9): Where the Victorian Transport Directorate is so requested by the Minister it shall provide advice on any of the following matters: (a) Transport policy and resource allocation; (b) Performance targets, budgets and forward planning; (c) Monitoring operational and financial performance; (d) The co-ordination and evaluation of information from the Authorities required for the Department of Management and Budget and other Government Departments and bodies; (e) Such other matters as may be referred to it by the Minister	

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			<p>Road Construction Authority (RCA)</p> <p>RCA shall consist of: (a) the Director-General of Transport; and (9) members (Governor in Council) Managing Director Authority Officer nominated by MD (2) elected officers (1) Person knowledge/experience: -in employment in the transport industry -passenger cars -operation of road transport vehicles; (1)Municipal Councillor (1) Other person</p>	<p>In exercising functions RCA will have regard to achieving - Part II 20(3):</p> <ul style="list-style-type: none"> - Use available transport resources to benefit community and with due regard to the enhancement of the environment -Improve the State's principal road network to facilitate the efficient vehicular movement of persons and goods -Operate efficiently/effectively within Government policy and other parameters determined by Victorian Transport Directorate -Improve productivity -Establish and maintain a satisfying work environment that ensures the broadest range of career development opportunities and job enrichment -Achieve efficient and dynamic organisation by implementing appropriate technological and other changes through a process of consultation beginning at the contemplative stage -Maintain effective decentralised organisation & delegate decision making to appropriate levels in Authority -Maintain harmonious relations between management staff and employee organisations through processes of effective consultation and participation in decision making -Develop/train personnel to carry out duties and responsibilities effectively and efficiently to interact with public in helpful/courteous manner and to enhance their work skills -Maintain high level of motivation, performance, team work and safe working practices and develop sense of commitment to organisation with employment conditions in keeping with community standards -Facilitate accountability at all levels within the Authority by maintaining suitable information and reporting systems -Effectively manage assets, including real estate, to protect future options and to provide for the planning, design, construction and management of new infrastructure and facilities as required -Minimise interference to the community arising from the construction and maintenance activities of the Authority -Provide mechanisms and full information to enable effective and timely participation by the community in decision making about road works. 	<p>RCA functions are - Part II 20(1):</p> <ul style="list-style-type: none"> -Maintain, upgrade, vary/extend State's declared road network -In conjunction with municipalities, assist in the maintenance, upgrading and construction of other roads -Subject to agreement with RTA purchase, design, construct, erect, install, maintain and operate traffic signals/other traffic facilities for the purposes of traffic management and control -Determine load limits and advisory speed limits for any road, bridge/culvert and maximum speed limits for travel on roads under construction or repair or over bridges/culverts -Provide and maintain roadside reserves adjacent to any road for use or enjoyment of persons using any such road -Establish guidelines and requirements for the issue of vehicle mass and dimension permits -Compete on the open market for road construction and other projects -Investigate, promote/undertake research into any matter related to the performance of its functions, powers or duties. 	<p>Additional Powers – RCA</p> <ol style="list-style-type: none"> 1. Temporarily close any road or any part of a road and temporarily stop all traffic or classes of traffic thereon. 2. To discontinue any existing road or part thereof and to sell any road or part so discontinued (and the provisions of sub-sections (2), (3) and (3B) of section 526 and of sub-sections (1) to (6) of section 527 of the Local Government Act 1958 and the Twenty ninth Schedule to that Act shall, so far as applicable and with such alterations modifications and substitutions as are necessary, extend to and apply in the case of any road or part so discontinued). 3. To cause any tree/hedge or part of tree or hedge growing or being on land adjoining any road to be removed at the expense of the owner or occupier of that land if the Authority is reasonably of the opinion that the road is in any manner prejudiced or obstructed by that tree or hedge or part. 4. To enter on any land for the purpose of removing anything causing any alteration or obstruction to or interference with the natural (flow of any surface water or any other (low of water being an alteration, obstruction or interference that causes any road for the maintenance of which the Authority is in whole or in part responsible to be injuriously affected by water. 5. To cause any structure, device or hoarding for exhibition of advertisements erected/placed in or upon any declared road or any advertisement exhibited on any declared road without consent in writing of the Authority to be removed or obliterated.
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	Act's Objective	Level	Authority	Structure/Body	Objective	Function	Other elements related to roadway priority treatments
1983 Transport Act			Road Traffic Authority (RTA)	RTA shall consist of: Director-General of Transport (9) members (Governor in Council) Managing Director Authority Officer nominated by MD (1) elected officers (1) Person knowledge/experience: - in use of passenger cars -operation of road transport vehicles -in employment in the transport industry (1)Member Victoria Police Force; (1)Municipal Councillor (1) Other person	In exercising functions RTA will have regard to achieving - Part II 18(2): -Use available transport resources to benefit community -Operate within Government policy and other parameters determined by the Victorian Transport Directorate -Achieve the efficient and safe movement of road traffic -Improve the community's awareness of road safety strategies and practices -Improve and simplify registration and licensing procedures and systems -Improve productivity -Establish/maintain satisfying work environment that ensures broadest range of career development opportunities and job enrichment -Achieve efficient/dynamic organisation by implementing appropriate technological & other changes through consultation beginning at contemplative stage -Maintain effective decentralised organisation & delegate decision making to appropriate levels in Authority -Maintain harmonious relations between management staff & employee organisations through processes of effective consultation & participation in decision making -Develop/train personnel to carry out duties & responsibilities effectively and efficiently to interact with the public in a helpful and courteous manner and to enhance their work skills -Maintain a high level of motivation, performance, teamwork and safe working practices and develop a sense of commitment to the organisation with employment conditions in keeping with community standards -Facilitate accountability at all levels within the Authority by maintaining suitable information and reporting systems -Provide mechanisms and full information to enable effective and timely participation by the community in decision making about facilities and services.	RTA functions are - Part II 18(1): -Provide registration and licensing procedures and systems in connexion with transport -Develop and implement road safety strategies and develop promote and administer road safety education and training programs -Develop and implement traffic management strategies and practices -Specify road accident prevention practices and to promote the adoption of such practices within the community -Develop and supervise regulations applicable to road traffic -Purchase, design, construct, erect, install, maintain and operate traffic signals -Investigate, promote and undertake research into any matter related to the performance of its functions, powers and duties -Compete for work on the open market. In addition to its powers, duties and functions under this Act, the Authority shall have such powers, duties and functions as are conferred on the Authority by the Motor Car Act 1958, the Motor Boating Act 1961, the Cttel Securities Act 1981 and any other Act.	
			The Metropolitan Transit Authority (MTA)	MTA shall consist of: Director-General of Transport (8) members (Governor in Council) of whom there shall be— Managing Director Authority Officer nominated by MD (2) elected officers	In exercising functions MTA will have regard to achieving - Part II 16(3): -Use available transport resources to benefit community -Operate within Government policy and other parameters determined by the Victorian Transport Directorate -Improve transit journey times by promoting and implementing schemes allocating traffic priority to on-street public transport services	MTA functions are - Part II 16(2): -Provide, manage and where in accordance with government policy operate transport services and facilities for passengers and freight -Arrange with STA, transport operators or other persons or bodies for the provision of transport services and facilities -Co-ordinate transport services -Develop integrated ticket systems -Develop new modes of transport;	Additional Powers – STA & MTA (Schedule 3) 1. To open and break up and divert traffic from any road and take possession of and use any road, street or way or portion of a road, street or way. 2. To fell and remove any tree or wood on any land within the distance of 60 metres from either side of a railway line which could obstruct or endanger the railway line or which

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				<p>(1) Person knowledge/experience: - public transport facilities - operation of private buses (2) Other person</p> <p>MTA to operate inside the Melbourne metropolitan area and may where the Minister so determines operates outside the Melbourne metropolitan area.</p>	<ul style="list-style-type: none"> -Effectively market integrated suburban passenger services and increase the use of these services -Improve standards of integrated accessible transport service and comfort for passengers -Improve and develop transport facilities & productivity -Encourage and facilitate cycling as access mode for public transport -Achieve rapid, reliable, efficient, courteous/effective level of service -Provide competitive & efficient passenger transport alternative to private transport -Establish/maintain satisfying work environment that ensures broadest range of career development opportunities and job enrichment -Achieve efficient and dynamic organisation by implementing appropriate technological and other changes through consultation beginning at the contemplative stage -Delegate decision making to appropriate levels in the Authority -Maintain harmonious relations between management, staff and employee organisations through effective consultation and participation in decision making -Develop and train all personnel to carry out their duties and responsibilities effectively and efficiently to interact with the public in a helpful and courteous manner and to enhance their work skills -Facilitate accountability at all levels within the Authority by maintaining suitable information and reporting systems -Effectively manage assets, including real estate, to protect future options and to provide for the planning, design, construction and management of new infrastructure and facilities as required -Minimise interference to the community arising from the construction and maintenance activities of the Authority -Identify transport needs of disadvantaged groups, particularly the disabled, and implement appropriate services within the level of funds specifically provided for this purpose by Government -Provide mechanisms and full information to enable effective and timely participation by community in decision making about facilities/services. 	<ul style="list-style-type: none"> -Investigate, promote/undertake research into any matter related to the performance of its functions, powers or duties; -Provide, manage/operate tourist/recreational facilities -Compete for work on the open market 	<p>may obstruct a view of a signal-box from any portion of the railway line.</p> <p>3. To open, examine and test any consignment of goods delivered or offered to the Authority for carriage.</p> <p>4. With the approval of the Minister, to declare by notice published in the Government Gazette that any specified level crossing shall be closed from such date as is specified in the notice or upon the fulfilment of such conditions as are specified in the notice whereupon the rights of the public to use the level crossing shall cease and determine and the land over which the crossing is constructed shall be freed from all rights, easements or privileges existing or claimed as regards that land either in the public or by any person or body of persons whomsoever or whatsoever as incident to any past dedication or supposed dedication thereof or by virtue of any past user thereof or by any fiction of law and the land shall be vested in the Authority,</p> <p>5. To declare by notice published in the Government Gazette any goods or class of goods to be dangerous goods which may only be delivered to the Authority for carriage with the consent of the Authority.</p> <p>6. After consultation with the Road Traffic Authority and the relevant municipal council, to install, remove or re-locate stopping places and associated facilities for transport services on any street or road.</p>
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	Act's Objective	Level	Authority	Structure/Body	Objective	Function	Other elements related to roadway priority treatments
1983 Transport Act			State Transport Authority (STA).	<p>STA shall consist of: Director-General of Transport (9) members (Governor in Council) Managing Director Authority Officer nominated by MD (2) elected officers (1) Person knowledge/experience - country public transport passenger facilities - public transport freight facilities - tourist industry; (1) Victorian Farmers and Graziers Association representative (1) Other person</p> <p>STA to operate railway and ancillary services both inside and outside the Melbourne metropolitan area.</p>	<p>In exercising functions STA shall have regard to achieving - Part II 14(4):</p> <ul style="list-style-type: none"> -Use available transport resources that benefit community -Operate within Government policy and other parameters determined by the Victorian Transport Directorate; -Develop integrated freight handling systems and improve and develop standards of services for freight; -Effectively market integrated freight services and country passenger services and increase the use of these services; -Improve standards of integrated accessible transport service and comfort for country passengers; -Improve and develop transport facilities & productivity; -Manage and operate freight services at a profit so as to phase out freight subsidies and to provide funds for capital works -Establish, manage and operate without cross subsidisation through the Workshops Management Board, efficient reliable & technologically up to date workshops with heavy engineering capacity & compete for work outside Authority -Achieve rapid, reliable, efficient, courteous, effective level of service -Provide competitive/efficient public freight and passenger transport alternative to private transport -Achieve efficient and dynamic organisation by implementing appropriate technological and other changes through consultation beginning at the contemplative stage -Delegate decision making to appropriate levels in the Authority -Maintain harmonious relations between management, staff and employee organisations through effective consultation and participation in decision making -Develop and train personnel to carry out their duties and responsibilities effectively and efficiently to interact with the public in a helpful and courteous manner and to enhance their work skills -Maintain high level of motivation, performance, team work and safe working practices and develop a sense of commitment to organisation with employment conditions in keeping with community standards -Facilitate accountability at all levels within the Authority by maintaining suitable information and reporting systems -Identify transport needs of disadvantaged groups, particularly the disabled and 	<p>STA Functions are - Part II 14(3):</p> <ul style="list-style-type: none"> -Provide, manage and operate transport services and facilities for passengers and freight Arrange with MTA, transport operators or other persons and bodies for the provision of transport services and facilities; -Authority for all officers engaged in the provision of railway and railway ancillary services in the State of Victoria; -Control and maintain all railway and railway ancillary equipment and facilities in the State of Victoria; -Co-ordinate transport services; -Develop new modes of transport -Investigate, promote/undertake research into any matter related to the performance of its functions, powers or duties; -Provide, manage/operate tourist/recreational facilities -Compete for work on the open market 	<p>Additional Powers – STA & MTA (Schedule 3)</p> <ol style="list-style-type: none"> 1. To open and break up and divert traffic from any road and take possession of and use any road, street or way or portion of a road, street or way. 2. To fell and remove any tree or wood on any land within the distance of 60 metres from either side of a railway line which could obstruct or endanger the railway line or which may obstruct a view of a signal-box from any portion of the railway line. 3. To open, examine and test any consignment of goods delivered or offered to the Authority for carriage. 4. With the approval of the Minister, to declare by notice published in the Government Gazette that any specified level crossing shall be closed from such date as is specified in the notice or upon the fulfilment of such conditions as are specified in the notice whereupon the rights of the public to use the level crossing shall cease and determine and the land over which the crossing is constructed shall be freed from all rights, easements or privileges existing or claimed as regards that land either in the public or by any person or body of persons whomsoever or whatsoever as incident to any past dedication or supposed dedication thereof or by virtue of any past user thereof or by any fiction of law and the land shall be vested in the Authority. 5. To declare by notice published in the Government Gazette any goods or class of goods to be dangerous goods which may only be delivered to the Authority for carriage with the consent of the Authority. 6. After consultation with the Road Traffic Authority and the relevant municipal council, to install, remove or re-locate stopping places and associated facilities for transport services on any street or road.

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					<p>implement appropriate services within the level of funds specifically provided for this purpose by Government</p> <ul style="list-style-type: none"> -Provide mechanisms and full information to enable effective and timely participation by the community in decision making about facilities and services -Encourage and facilitate cycling as access mode for public transport 	
<p>1989 Transport (Amendment) Act</p>	<p>(a) to reduce the number of Transport Authorities. (b) to make other miscellaneous amendments to the Transport Act 1983; and (c) to make consequential amendments to the Transport Act 1983 and other legislation.</p>	<p>State Corporate Authority State Corporate Authority</p>	<p>Roads Corporation</p>	<p>Roads Corp consists of: (1) Member (Governor in Council) as Chief Executive of the Public Transport Corporation</p> <p>Management of Corporation: CEO is responsible for management of corporate affairs</p> <p>Minister must appoint a Board to advise CEO and shall be: CEO of corporation (11) members: (1) nominated by Minister (3) Roads Corp officers (1) Person knowledge/experience: -in the transport industry -in use of passenger cars (1) selected from panel of three names submitted to Minister by: -Vic Road Transport Association -Victoria Police Force -Victorian Farmers Federation -Royal Automobile Club of Victoria (1) Municipal councillor</p>	<p>Roads Corp shall have regard to achieving - Part II 16(3):</p> <ul style="list-style-type: none"> -Make use of available transport resources in ways which are most beneficial to the community and with due regard to the enhancement of the environment -Operate within Government policy and other parameters determined by the Victorian Transport Directorate -Achieve the efficient and safe movement of road traffic -Improve the community's awareness of road safety strategies and practices -Improve/simplify registration, licensing procedures/systems -Improve State's principal road network to facilitate the efficient vehicular movement of people and goods -Improve productivity -Establish and maintain a satisfying work environment that ensures broadest range of opportunities for career development and job enrichment (j) To maintain an effective decentralised organisation and to delegate decision making to appropriate corporate levels -Maintain harmonious relations between management and staff through a process of effective consultation and participation in decision making -Develop and train personnel to carry out duties & responsibilities effectively and efficiently, to interact with public in helpful & courteous manner and to enhance their work skills; -Facilitate accountability at all levels within the Corporation by maintaining suitable information and reporting systems -Manage its assets effectively, including real estate, to protect future options and provide for planning, design, construction and management of new infrastructure -Minimise interference to the community arising from the construction and maintenance activities of the Corporation -Provide mechanisms and full information to enable effective and timely participation by the community in decision making about facilities, services and road works. 	<p>Roads Corp Functions are - Part II 16(1):</p> <ul style="list-style-type: none"> -Maintain, upgrade, vary and extend the State's declared road network; -In conjunction with municipalities, assist in the maintenance, upgrading and construction of other roads -Purchase, design, construct, erect, install, maintain and operate traffic signals and other traffic facilities for the purposes of traffic management and control; -Determine load limits and advisory speed limits for any road, bridge or culvert and to determine maximum speed limits for travel on roads under construction or repair or over bridges or culverts -Provide and maintain roadside reserves adjacent to any road for the use or enjoyment of people using that road -Establish guidelines and requirements for the issue of vehicle mass and dimension permits -Provide registration and licensing procedures and systems in connection with transport -Develop and implement road safety strategies, and to develop, promote and administer road safety education and training programs; -Develop and implement traffic management strategies and practices; -Specify road accident prevention practices and to promote the adoption of those practices within the community -Develop and supervise regulations applicable to road traffic -Compete for work on the open market; -Investigate and to promote and undertake research into any matter related to the performance of its functions, powers or duties. <p>In addition to its powers, duties and functions under this Act, the Roads Corporation has any powers, duties and functions that are conferred on it by the Chattel Securities Act 1987, the Road Safety Act 1986 and any other Act.</p>

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	Act's Objective	Level	Authority	Structure/Body	Objective	Function	Other elements related to roadway priority treatments
1989 Transport (Amendment) Act	(a) to reduce the number of Transport Authorities. (b) to make other miscellaneous amendments to the Transport Act 1983; and (c) to make consequential amendments to the Transport Act 1983 and other legislation.	State Corporate Authority State Corporate Authority	Public Transport Corporation	<p>PTC consists of:</p> <p>(1) Member (Governor in Council) as Chief Executive of the Public Transport Corporation</p> <p>Management of Corporation: CEO is responsible for management of corporate affairs</p> <p>Minister must appoint a Board to advise CEO and shall be:</p> <p>CEO of corporation (13) members: (1) nominated by Minister (4) PTC officers (1) Person knowledge/experience</p> <p>-use of public transport facilities -use of country public transport passenger facilities -use of public transport freight facilities --in the tourist industry (1) selected from panel of three names submitted to Minister by:</p> <p>-Vic Bus Proprietors' Association -Vic Farmers Federation -Vic Road Transport Association -Municipal Association of Victoria</p>	<p>In exercising functions PTC shall have regard to achieving - Part II 14(2):</p> <p>-Use of available transport resources in ways most beneficial to the community -Operate within Government policy and other parameters determined by the Victorian Transport Directorate -Develop integrated freight handling systems and improve and develop standards of services for freight -Market integrated freight services and passenger services effectively and to increase the use of these services -Improve transit times by promoting and implementing schemes allocating traffic priority to on-street public transport services -Improve standards of integrated accessible transport service and comfort for passengers -Improve and develop transport facilities -Improve productivity -Establish, manage and operate without cross subsidisation through the Workshops Board efficient, reliable and technologically up to date workshops with a heavy engineering capacity, and to compete for work outside the Corporation -Achieve rapid, reliable, efficient, courteous/effective LOS -Provide a competitive and efficient public freight and passenger transport alternative to private transport -Establish and maintain a satisfying work environment which ensures the broadest range of opportunities for career development and job enrichment -Delegate decision making to appropriate corporate levels -Maintain harmonious relations between management and staff and employee organisations through a process of effective consultation and participation in decision making -Maintain high level of motivation, performance, team work and safe working practices and to develop a sense of commitment to the organisation with employment conditions in keeping with community standards -Facilitate accountability at all levels within the Corporation by maintaining suitable information and reporting systems -Manage its assets effectively, including real estate, to protect future options and to provide for planning, design, construction and management of new infrastructure -Minimise interference to the community arising from the construction and</p>	<p>PTC Functions are - Part II 14(1):</p> <p>-Provide, manage and operate transport services and facilities for passengers and freight -Arrange with transport operators or other people and bodies for the provision of transport services and facilities -Control and maintain all railway and railway ancillary equipment and facilities in Victoria -Co-ordinate transport services -Develop integrated ticket systems -Develop new modes of transport -Investigate and promote and undertake research into any matter related to the performance of its functions, powers or duties -Provide, manage and operate tourist and recreational facilities -Compete for work on the open market.</p>	

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					<p>maintenance activities of the Corporation</p> <p>-Identify transport needs of disadvantaged groups, particularly people with disabilities, and implement appropriate services within the level of funds specifically provided for this purpose by Government</p> <p>-Provide mechanisms and full information to enable effective and timely participation by the community in decision making about facilities and services</p> <p>-Encourage/facilitate cycling as access mode for public transport.</p>		
1992 Transport (Amendment) Act	<p>(a) establish new management & accountability arrangements for PTC, and, in particular, create management board for Corporation; and</p> <p>(b) make various other administrative changes to the Transport Act 1983.</p>	State	Public Transport Corporation	<p>Abolished Victorian Transport Directorate</p> <p>Established a management board</p>	<p>5(2) and (3): Outline who management board is:</p> <p>(2) The Board of the Corporation is responsible for the management of the affairs of the Corporation.</p> <p>(3) The Board of the Corporation is to consist of—</p> <p>(a) a Chairperson appointed by the Minister; and</p> <p>(b) Chief Executive of Corporation</p> <p>(c) 2 people appointed by Minister who have such managerial or other qualifications as the Minister considers necessary to enable the Board to carry out its functions.</p>	<p>The Ministry, through the Directorate is responsible for the formulation of corporate objectives and strategy, resource budgeting, performance targets, financial coordination and general corporate management as well as the implementation of central strategic decisions.</p> <p>New title Secretary to the Department of Transport:</p> <p>3. Minor consequential amendment</p> <p>In the Transport Act 1983 in section 7A, for "Director-General of Transport" substitute "Secretary to the Department of Transport".</p>	
2004 Road Management Act	<p>The purpose of this Act is to reform the law relating to road management in Victoria and to make related amendments to certain Acts</p>	State Corporate and non-corporate Authorities and Local Councils	VicRoads		<p>The primary object of this Act is to establish a coordinated management system that will promote safe and efficient road networks at State and local levels and the responsible use of road reserves for other legitimate purposes.</p>	<p>-Sets out general rights of roads users</p> <p>-Establishes system for management of safe and efficient public roads that best meet the needs and priorities of State and local communities</p> <p>-Establishes a system of classification for roads and sets clear principles about the division of responsibilities between State and local road authorities;</p> <p>-Provides mechanisms for coordinating placement & maintenance of infrastructure on road reserves, and carrying out related works</p> <p>-Provides for keeping of registers of public roads which register those roads which must be constructed, maintained and managed by road authorities</p> <p>-Establishes decision-making processes in relation to standards for construction, inspection, maintenance, repair of State and municipal roads</p> <p>-Sets out powers and duties of road authorities to manage roads, duties of infrastructure managers which install and maintain infrastructure on roads, duties of works managers which carry out works on roads</p> <p>-Confers adequate operational powers and imposes corresponding accountability on road authorities in relation to road management</p> <p>Enables Codes of Practice to be made that give practical guidance in relation to exercise of powers, functions and duties</p> <p>-Clarifies the law relating to civil liability for the management of public roads and other roads</p> <p>-Provides for protection of roads against damage & interference.</p>	<p>Provides VicRoads with power to manage Clearways</p> <p>Hansard 2nd Readings Ms Romanes (Melbourne and Mr Wyne (Richmond)</p> <p>Schedule 4 Specific Traffic Management Powers of State Road Authorities</p> <p>2 Powers concerning parking (2)VicRoads may with respect to arterial roads—</p> <p>(a)manage clearways; and (b)make policy decisions in relation to traffic management after consultation with any affected municipal councils.</p>

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	Act's Objective	Level	Authority	Structure/Body	Objective	Function	Other elements related to roadway priority treatments
2010 Integrated Transport Act	The purpose of this Act is to create a new framework for the provision of an integrated and sustainable transport system in Victoria consistent with the vision statement	State Authority	DOT		<p>Object of the Department (DOT)</p> <ul style="list-style-type: none"> -Ensure that a transport system is provided consistent with the vision statement and the transport system objectives -Determine strategic policies which specify priorities for the transport system that address current and future challenges -Ensure in collaboration with transport bodies and other bodies that policies and plans for an integrated and sustainable transport system are developed, aligned and implemented 	<p>The principal function of the Department is to assist the Minister in the administration of this Act and other transport legislation and to do anything that is necessary or convenient to be done for or in connection with, or as incidental to, the achievement of its objects.</p> <p>Functions of the Department include:</p> <ul style="list-style-type: none"> -Be the lead in all of the strategic policy, advice and legislation functions relating to the transport system and related matters other than road safety -Co-ordinate the development of regulatory policy and legislation advice relating to the transport system and related matters -Lead in the improvement of the transport system, including the development and construction of new transport infrastructure and the provision of new transport services -Develop strategies, plans, standards, performance indicators, programs and projects relating to the transport system and related matters -Develop and issue guidelines with respect to the implementation and operation of this Act -Co-ordinate corporate planning and budgets so as to assist transport bodies with the development, alignment, implementation and monitoring of their corporate plans and budgets -Undertake operational activities including transport system operations, asset management and project management -Collect transport data and undertake research into the transport system to support the functions specified in paragraphs (within Act) -Provide corporate, financial management, property and other specialist services to transport bodies -Provide assistance to public entities and private bodies to construct or improve transport facilities and to provide services ancillary to those facilities -Carry out efficiently and effectively any contract entered into by the Minister on behalf of the Crown 	<p>Part 2 Division 1 provided Vision Statement</p> <p>Part 2 Division 2 provided Transport System Objectives based on:</p> <ul style="list-style-type: none"> social and economic inclusion; economic prosperity; environmental sustainability; integration of transport and land-use; efficiency, co-ordination and reliability; and safety and health and well-being. <p>Part 2 Division 3 provided decision making principles based on:</p> <ul style="list-style-type: none"> Integrated decision-making; triple-bottom line assessment; equity; transport system user perspective; precautionary principle; stakeholder engagement and community participation; and transparency. <p>Part 2 Division 4 provided statements of policy principles.</p> <p>Part 2 Division 5 provided interpretation and guidance based on the previous 4 divisions.</p> <p>Part 4 specifies that the Department must prepare and periodically revise the Victorian Transport Plan for the Minister and that the plan must include (various elements as stated in the Act).</p>
		State Corporate Authority	VicRoads		<p>Object of the Roads Corporation</p> <ul style="list-style-type: none"> -The primary object of the Roads Corporation is to provide, operate and maintain the road system consistent with the vision statement and the transport system objectives <p>Additional primary objectives include:</p> <ul style="list-style-type: none"> -Ensure, in collaboration with other transport bodies and public entities, that the road system operates as part of an integrated transport system which seeks to meet the needs of all transport system 	<p>Functions of VicRoads</p> <ul style="list-style-type: none"> -Construct, maintain or vary roads, rail infrastructure and other transport assets -Provide and maintain roadsides -Plan for the road system as part of an integrated transport system -Lead development and implementation of strategic and operational policies and plans to improve the safety of the road system for all users, including through: <ul style="list-style-type: none"> --works to improve the safety of road and road-related infrastructure --information and advice on the safety of motor 	

Appendix 3 Summary of Legislative Acts

					<p>users</p> <ul style="list-style-type: none"> -Manage the road system in a manner which supports a sustainable Victoria by: <ul style="list-style-type: none"> -- seeking to increase the share of public transport, walking and cycling trips as a proportion of all transport trips in Victoria -- while seeking to give effect to above sub-objective, also seeking to improve the environmental performance and minimise the adverse environmental impacts of the road system -Contribute to social wellbeing by providing access to opportunities and supporting liveable communities -Promote economic prosperity through efficient and reliable movement of persons and goods -In collaboration with relevant bodies including other road authorities, Victoria Police, the Transport Accident Commission, the Director of Public Transport, the Director, Transport Safety, the Department and the Department of Justice, to improve the safety of the road system for road users and seek to reduce deaths and injuries. 	<p>vehicles and motor vehicle standards</p> <ul style="list-style-type: none"> --education and training to improve the safety of road user behaviour --enforcement activities --road safety legislation, regulations, standards, guidelines and practices -Develop and implement operational policies and plans, including through legislation, regulations, standards, guidelines and practices, for the road system and related matters consistent with the strategic policies and plans of the Department -Operate the road system by managing access and controlling use, including by: <ul style="list-style-type: none"> --installing, operating and maintaining road and road-related infrastructure such as signals, signage, line markings, intelligent transport systems and other road management systems --implementing road space allocation measures to give priority to particular modes of transport at certain times on specified roads or parts of roads --manage road works, incidents, events on roads to minimise disruption to the road system --implement appropriate enforcement strategy -provide registration, licensing and accreditation services for the transport system -provide technical, project management, consultancy and information services related to transport system, including on a commercial basis consistent with government policy -provide advice to Secretary in development of strategic policy and legislation relating to the transport system -protect future options for the improvement of the transport system including reserving land for future transport corridors -develop and implement effective environmental policies, strategies and management systems consistent with the strategic policy of the Department to support a sustainable transport system, including minimising any adverse environmental impacts from the road system -provide and disseminate information to Victorians about the road system and related matters, including on a commercial basis consistent with government policy -perform any other functions or duties conferred on the Roads Corporation by any other Act or any regulations under any other Act. <p>In performing functions—</p> <ul style="list-style-type: none"> -Engage with stakeholders so as to ensure better outcomes for all Victorians -Conduct research and collect information relating to performance of the functions and operation of road system to enable the Roads Corporation to meet their primary objective -Efficiently deal with any complaints relating to the performance of its functions. 	
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